Powerware

# Powerware® 9315 UPS
# 200–300 kVA
# Installation Manual

## IMPORTANT SAFETY INSTRUCTIONS
## SAVE THESE INSTRUCTIONS

This manual contains important instructions that you should follow during installation and maintenance of the UPS and batteries. Please read all instructions before operating the equipment and save this manual for future reference.

## Consignes de sécurité

### CONSIGNES DE SÉCURITÉ IMPORTANTES
### CONSERVER CES INSTRUCTIONS
### CE MANUEL CONTIENT DES CONSIGNES DE SÉCURITÉ IMPORTANTES

## Class A EMC Statements

### FCC Part 15

**NOTE** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**WARNING**

This is a product for restricted sales distribution to informed partners. Installation restrictions or additional measures may be needed to prevent disturbances.

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# Table of Contents


**1 Introduction . . . . . 1-1**

1.1 Using This Manual . . . . . 1-2

1.2 Conventions Used in This Manual . . . . . 1-2

1.3 For More Information . . . . . 1-3

1.4 Getting Help . . . . . 1-3

**2 Getting Started . . . . . 2-1**

2.1 Preparing Your Site . . . . . 2-2

2.2 Environmental Considerations . . . . . 2-2

2.3 Preparing for Wiring the UPS System . . . . . 2-2

2.4 Inspecting and Unpacking Each Cabinet . . . . . 2-3

**3 Installing the UPS . . . . . 3-1**

3.1 Installing the UPS Cabinet . . . . . 3-1

3.2 Prepare for Installing Optional Cabinets or Accessories . . . . . 3-4

3.3 Completing the Installation Checklist . . . . . 3-6

**4 Installing Battery Cabinets . . . . . 4-1**

4.1 Important Safety Instructions . . . . . 4-1

4.1 Recycling the Used Battery or UPS . . . . . 4-3

**5 Installing Input and Output Transformers . . . . . 5-1**

**6 Installing a Power Distribution Module . . . . . 6-1**

**7 Installing a Remote Emergency Power-Off . . . . . 7-1**

**8 Installing a Remote Battery Disconnect . . . . . 8-1**

**9 Installing a Remote Monitor Panel . . . . . 9-1**

**10 Installing a Relay Interface Module . . . . . 10-1**

**11 Installing a Supervisory Contact Module . . . . . 11-1**

**Appendix A – Customer Information . . . . . A-1**

## List of Figures

Figure 1-1. Typical Powerware 9315 UPS System . . . . . 1-1
Figure 2-1. Cabinet as Shipped, with Outer Packaging-Rear View . . . . . 2-3
Figure 3-1. Removable I/O Section . . . . . 3-2
Figure 3-2. Removing Front and Rear Supports . . . . . 3-3
Figure 3-3. Preparing the UPS for Installation . . . . . 3-5
Figure 5-1. Input Transformer Cabinet . . . . . 5-1
Figure 5-2. Input Transformer Cabinet (208/480V) . . . . . 5-2
Figure 5-3. Output Transformer Cabinet (480/208V) . . . . . 5-3
Figure 5-4. Installing an Input Transformer Cabinet . . . . . 5-6
Figure 5-5. Installing a 208/480 Vac Input Transformer Cabinet . . . . . 5-7
Figure 5-6. Installing a 480/208 Vac Output Transformer Cabinet . . . . . 5-8
Figure 6-1. Typical PDM Cabinet . . . . . 6-1
Figure 7-1. Remote EPO Control . . . . . 7-1
Figure 7-2. Remote EPO . . . . . 7-2
Figure 8-1. Remote Battery Disconnect Enclosure . . . . . 8-1
Figure 9-1. Remote Monitor Panel . . . . . 9-2
Figure 9-2. Terminal Block Bracket . . . . . 9-3
Figure 9-3. Wiring an RMP to the UPS . . . . . 9-4
Figure 10-1. Relay Interface Module . . . . . 10-1
Figure 10-2. Terminal Block Bracket . . . . . 10-2
Figure 10-3. Wiring an RIM to the UPS . . . . . 10-2
Figure 11-1. Supervisory Contact Module . . . . . 11-1
Figure 11-2. Terminal Block Bracket . . . . . 11-2
Figure 11-3. Wiring an SCM to the UPS . . . . . 11-2
Figure 11-4. Supervisory Contact Module TB2 . . . . . 11-4

# Chapter 1 Introduction

This manual describes how to install your Powerware® 9315 uninterruptible power supply (UPS) system. It contains instructions for installing the UPS and each optional component and accessory. The information you will use depends on the system you purchased.

Each component of your UPS system is housed in a free-standing cabinet. The cabinets line up and match in style and color, and have safety shields behind the doors for hazardous voltage protection. Figure 1-1 shows a typical UPS system that includes at least one of each component.

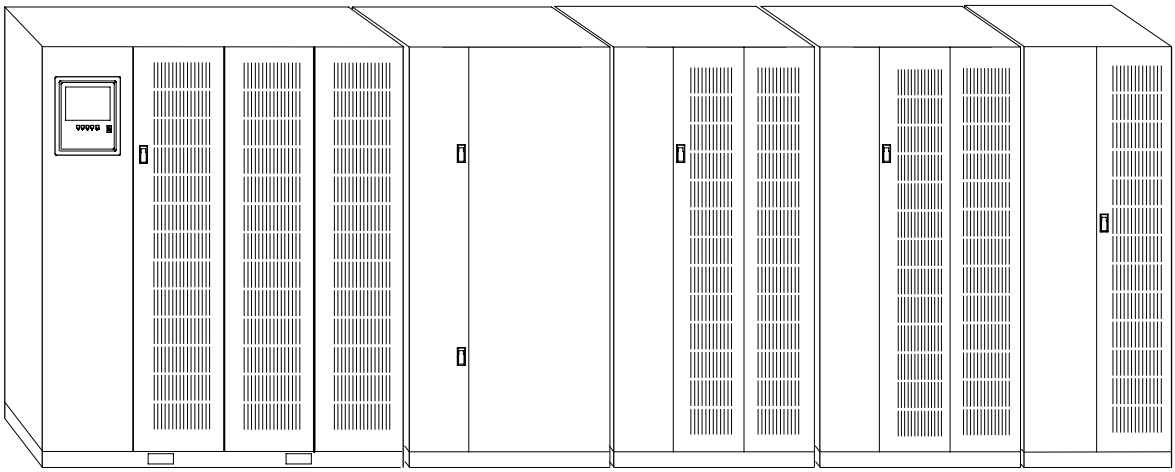


**Figure 1-1. Typical Powerware 9315 UPS System**

These basic UPS system configurations are possible:

- The UPS and one or more battery cabinets
- The UPS, battery cabinet(s), and a Power Distribution Module (PDM)
- The UPS, battery cabinet(s), and an input transformer cabinet
- The UPS, battery cabinet(s), PDM, and an input transformer cabinet
- The UPS, battery cabinet(s), an input transformer cabinet, and an output transformer cabinet
- The UPS, battery cabinet(s), PDM, an input transformer cabinet, and an output transformer cabinet

You can enhance any of these system configurations by adding optional accessories such as a Remote Monitor Panel (RMP), Relay Interface Module (RIM), Supervisory Contact Module (SCM), or Remote Emergency Power-Off (EPO) control.

## 1.1 Using This Manual

The system you are installing dictates which parts of this manual you should read. Everyone should read Chapters 1 through 3:

- Chapter 1 discusses installation considerations for your entire UPS system.
- Chapter 2 tells you how to prepare your site for the installation of your UPS system. It discusses equipment environmental requirements, inspecting, and unpacking cabinets.
- Chapter 3 describes how to install the UPS cabinet.
- Chapter 4 contains safety instructions and general notes for installation of the UPS manufacturer's optional battery cabinets.
- Chapter 5 contains information for installing optional input and output transformer cabinets.
- Chapter 6 contains information for installing the optional PDM.
- Chapter 7 contains information for installing the optional Remote EPO control.
- Chapter 8 contains information for installing the optional remote battery disconnect.
- Chapter 9 contains information for installing the optional RMP.
- Chapter 10 contains information for installing the optional RIM.
- Chapter 11 contains information for installing the optional SCM.
- Appendix A contains important information for planning and installing your UPS system, including illustrations of cabinets and optional accessories.

Read through each installation procedure before you begin. Perform only those procedures that apply to the UPS system you are installing.

## 1.2 Conventions Used in This Manual

This manual uses these type conventions:

- **Bold type** highlights important concepts in discussions, key terms in procedures, and menu options, or represents a command or option that you type or enter at a prompt.
- *Italic type* highlights notes and new terms where they are defined.
- `Screen type` represents information that appears on the screen or LCD.

| Icon | Description |
|---|---|
| | Information notes call attention to important features or instructions. |
| [Keys] | Brackets are used when referring to a specific key, such as [Enter] or [Ctrl]. |

In this manual, the term *UPS* refers only to the UPS cabinet and its internal elements. The term *UPS system* refers to the entire power protection system – the UPS cabinet, battery strings, and options or accessories installed.

## 1.3 For More Information

Refer to the ***Powerware 9315 UPS (200–300 kVA) Operation Manual*** for more information about the operation and communication capabilities of the UPS system:

- Describes the UPS cabinet Control Panel and Monitor Panel, and explains the functions of the UPS; discusses the standard features of the UPS and optional accessories; provides procedures for starting and stopping the UPS, and information about maintenance and responding to system events.
- Also described are the RS-485 and RS-232 serial communication capabilities of the UPS system, how to connect optional remote accessories to your UPS system, and information about enabling, disabling, and customizing building alarms.

Visit www.powerware.com or contact your Eaton service representative for information on how to obtain copies of this manual.

## 1.4 Getting Help

If help is needed with any of the following:

- Scheduling initial startup
- Regional locations and telephone numbers
- A question about any of the information in this manual
- A question this manual does not answer

Please call the Eaton Help Desk for Powerware products at:

| | |
|---|---|
| In the United States | **1-800-843-9433 or 1-919-870-3028** |
| In Canada | **1-800-461-9166** |
| All other countries | **Call your service representative** |

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# Chapter 2 Getting Started

Each cabinet of your UPS system is shipped on a separate pallet. Use a forklift or pallet jack to move the packaged cabinets to the installation site, or as close as possible to the site, before you unload them from the pallets.

This is the basic sequence of the installation steps:

1. Prepare your site for the UPS cabinet (Chapter 2).
2. Inspect, unpack, and unload the UPS cabinets (Chapter 2).
3. Create an installation plan for the UPS and optional cabinets (Chapter 3).
4. Wire the cabinets together (Chapters 4 through 11, as applicable).
5. Install features, accessories, and/or options (Chapters 4 through 11, as applicable).
6. Complete the Installation Checklist (Chapter 3).
7. Have authorized service personnel perform preliminary checks and startup.

After wiring the UPS system to the facility power and critical load(s), be sure to ground the system according to local and/or national electrical wiring codes, using your own cabling and conduit.

Install batteries in accordance with all applicable codes and regulations, including the National Electrical Code (NEC) Article 480.

**NOTE** *Startup and operational checks should be performed only by authorized service personnel. This service is usually offered as part of the sales contract for your UPS system.*

## 2.1 Preparing Your Site

For your UPS system to operate at peak efficiency, the installation site should meet the environmental specifications outlined in the *Powerware 9315 UPS (200–300 kVA) Operation Manual*. If you intend to operate the UPS at an altitude higher than 1500m (5000 ft), contact your Eaton service representative for important information about high altitude operation. The operating environment must meet the size and weight requirements shown in Table N on page A-13.

The basic environmental requirements for operation of the UPS system are:

- **Ambient Temperature Range:** 0–40°C (32–104°F)
- **Recommended Operating Range:** 20–25°C (68–77°F)
- **Maximum Relative Humidity:** 95%

The UPS cabinet uses forced air cooling to regulate internal component temperature. The battery and optional component cabinets use convection cooling to regulate internal component temperature. Air inlets are in the front of the cabinet, and outlets are in the top. You must allow clearance in front of and above each cabinet for proper air circulation.

## 2.2 Environmental Considerations

The life of the UPS system is adversely affected if the installation does not meet the following guidelines:

1. The UPS system must be installed on a sealed concrete pad on a sealed concrete floor.
2. The UPS system must be installed in a temperature-controlled indoor area free of conductive contaminants.

## 2.3 Preparing for Wiring the UPS System

For external wiring requirements, including the minimum AWG size of external wiring, see Table A through Table F beginning on page A-2. The power wiring connections for this equipment are rated at 75°C (167°F). If the ambient temperature is greater than 30°C (86°F), a higher temperature and/or larger size wire may be necessary. Wiring for optional accessories (such as a Remote Monitor Panel or Relay Interface Module) should be installed through the knockout in the bottom of the UPS cabinet. The top entry connection requires installation of 13 mm (0.5″) flexible conduit within the UPS. Bottom entry connection requires no additional routing of conduit within the UPS.

## 2.4 Inspecting and Unpacking Each Cabinet

The first task in preparing for installation is inspecting and unpacking each cabinet. Cabinets arrive covered with protective packaging material as shown in Figure 2-1.

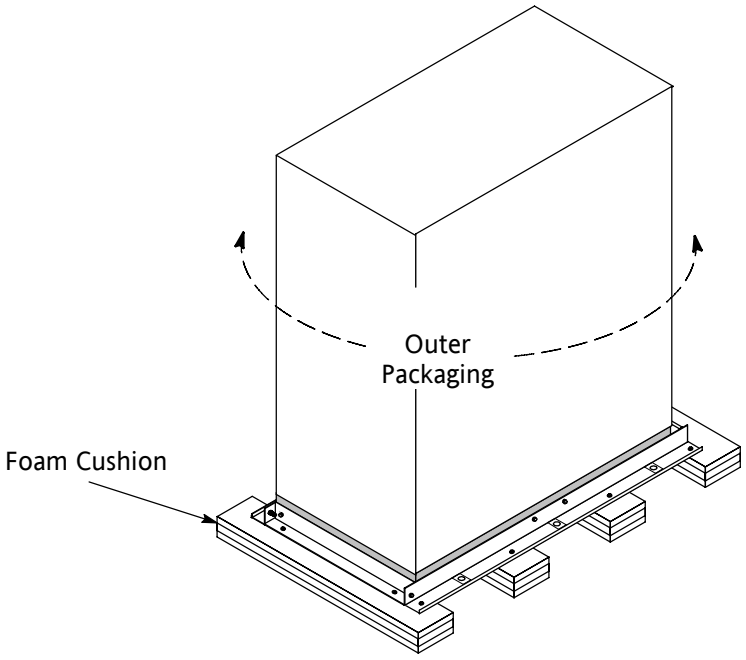


**Figure 2-1. Cabinet as Shipped, with Outer Packaging-Rear View**

1. Carefully inspect the outer packaging for evidence of damage during transit.

**CAUTION**

Do not install a damaged cabinet. Report any damage to the carrier and your Eaton service representative immediately.

2. Use a forklift or other material handling equipment to move the cabinet to a convenient unpacking area. Insert the forklift jacks between the foam cushions on the bottom of the unit.

**CAUTION**

Do not tilt cabinets more than 10° from vertical.

3. Set each pallet on a firm, level surface, allowing a minimum clearance of 4.6m (15 ft) on each side for removing the cabinets from the pallets.
4. Cut the steel bands around each cabinet.
5. Remove the protective cardboard covering from the cabinets, cutting where indicated, using a knife blade no longer than 25 mm (1″).
6. Remove the plastic bag and foam packing material, and discard or recycle them in a responsible manner.

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# Chapter 3 Installing the UPS

**WARNING**

Installation should be performed by qualified personnel.

Refer to the following while installing the UPS:

- Dimensions in this manual are in millimeters and inches.
- Do not tilt the UPS or other cabinets more than ±10° during installation.
- Cooling exhaust airflow is approximately 1420 L/S (3000 CFM).
- The conduit landing plates are to be removed to add conduit landing holes as required. Plate material is 16 gauge steel (0.06″ thick).
- Terminals E1-E15 are UL and CSA rated at 90°C. A hex key tool is required to attach wires to the terminals.
- The Remote Emergency Power-Off feature opens all breakers and contactors in the UPS cabinet and isolates power from your critical load. Local electrical codes may also require tripping upstream protective devices to the UPS.
- UPS cabinet must be installed on a level, sealed concrete pad or floor.
- If perforated floor tiles are required for ventilation, place them in front of the UPS. See Table N on page A-13 for equipment weight.
- All circuit breakers provided as part of the UPS system that employ adjustable trip mechanisms have been set to their maximum settings. Based upon the energy available and other equipment located on-site, these settings may need to be adjusted to ensure proper system operation and coordination. It is the customer's responsibility to conduct a breaker coordination study, so that these breakers can be adequately set for the site.
- Details about control wiring are provided in each procedure for connecting options and features. Table Q on page A-16 identifies the control wiring terminations.

## 3.1 Installing the UPS Cabinet

**WARNING**

UPS cabinets are extremely heavy. If unloading instructions are not closely followed, the cabinet may tip and cause serious injury.

The UPS cabinet is bolted to a sheet metal pallet consisting of four supports secured to foam cushions. The foam cushions act as shock absorbers for the cabinet during shipment and movement to the installed location.

See Figure 3-1 before installing the UPS cabinet. The UPS cabinet base is equipped with forklift slots to accommodate lifting and moving the equipment. The forklift slots are located on all four sides of the cabinet base to meet individual needs. The wireway section on the right side of the UPS cabinet (as seen from the front) must be removed to gain access to the right side fork lift slots (see Figure 3-1).

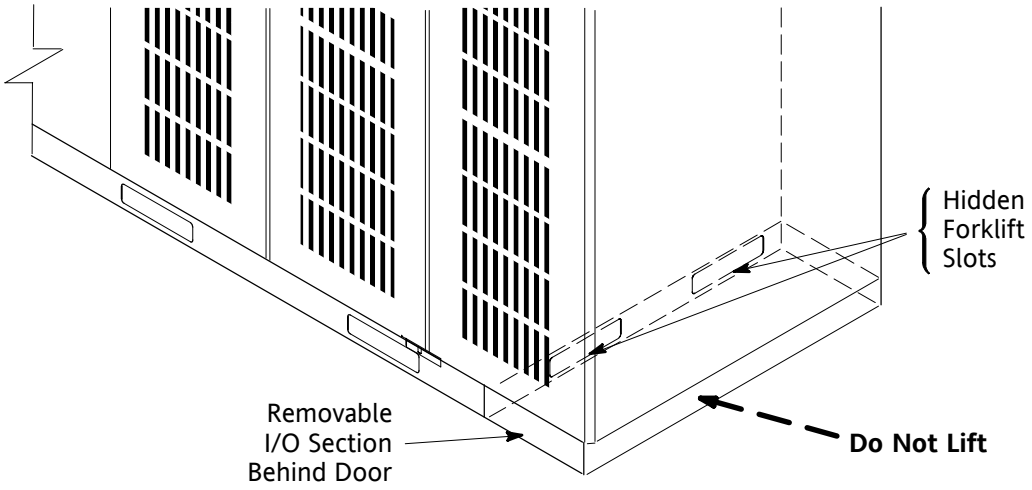


**Figure 3-1. Removable I/O Section**

1. Move the UPS to the final installed location using forklift jacks between the foam cushions on the bottom of the unit.
2. Remove hardware labeled “1” and “2” in Figure 3-2, then remove the sheet metal support on the desired face of the unit base to expose the forklift slots.
3. Loosen, but do not remove the hardware holding the foam cushions to the other sheet metal supports (labeled “1” in Figure 3-2).

**CAUTION**

Lift only at forklift openings or cabinet damage may occur.

4. Insert the forklift jacks in the forklift slots and raise the UPS cabinet until the foam cushions clear the floor by approximately 3 mm (1/8″).

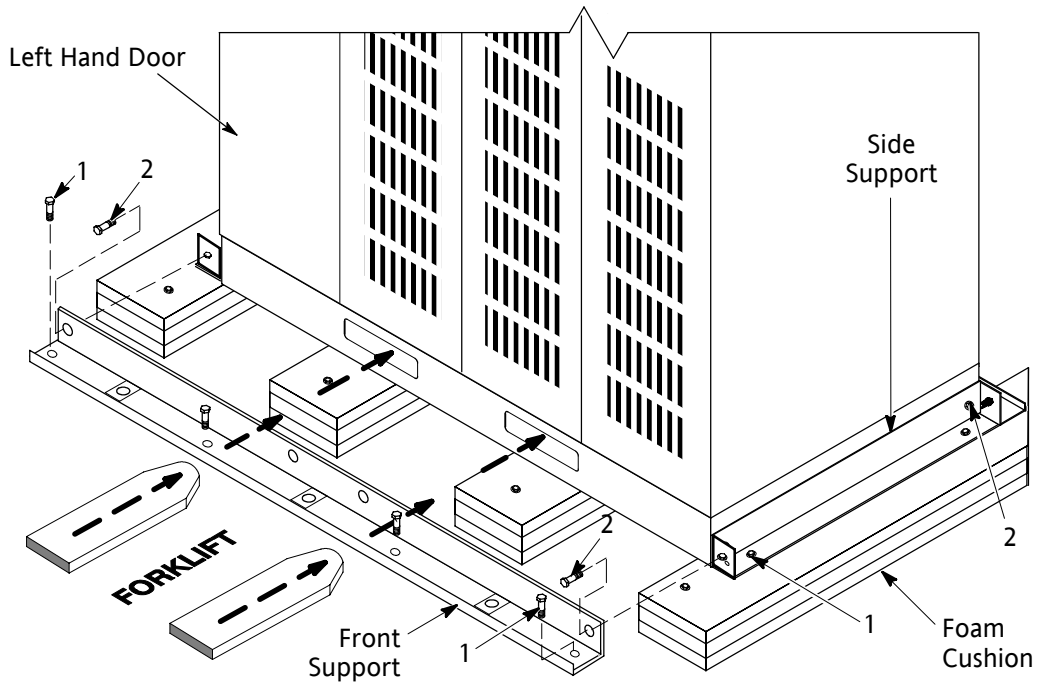


**Figure 3-2. Removing Front and Rear Supports**

5. After the foam cushions clear the floor, remove the hardware loosened in Step 3. Pull the foam cushions from under the UPS cabinet. Discard or recycle them in a responsible manner.

**WARNING**

Cabinet may fall. Do not loosen hardware attaching the side or front supports to the cabinet base. Also, do not loosen supports from each other. The cabinet must be lowered using jacking bolts before supports can be removed.

6. Carefully lower the cabinet until the UPS cabinet base contacts the floor.
7. Remove the hardware holding the front, rear, and side supports to the cabinet base (labeled “2” in Figure 3-2). Discard or recycle the hardware and support brackets in a responsible manner.
8. Repeat Steps 1 through 7 for each cabinet you are preparing to install.

## 3.2 Prepare for Installing Optional Cabinets or Accessories

If you are installing optional cabinets or accessories, such as a Power Distribution Module cabinet, an input transformer, an output transformer, or a Remote Monitor Panel, you must install conduit between each device and the UPS cabinet for wiring these options. See Figure 3-3 for the location of the interface points within the UPS cabinet. Also, refer to the *Powerware 9315 Series 685 and 1085 Auxiliary Battery Cabinets Installation Manual* for information on installing battery cabinets.

To prepare the UPS for wiring to an input transformer, output transformer, PDM, or all:

1. Be sure the UPS is turned off and all power sources are removed. (Refer to the *Powerware 9315 UPS (200–300 kVA) Operation Manual* for instructions.)
2. Open the doors of the UPS.
3. Remove the stationary right side door and set it aside for later use.
4. Remove the air filters and set aside for later use.
5. Remove the lower metal access panel. Set the access panel and hardware aside for later use.

To prepare the UPS for wiring to an RMP, Relay Interface Module, Supervisory Contact Module, or Remote EPO:

1. Be sure the UPS is turned off and all power sources are removed. (Refer to the *Powerware 9315 UPS (200–300 kVA) Operation Manual* for instructions.)
2. Open the doors of the UPS.
3. Remove the air filters and set aside for later use.
4. Remove the lower metal access panel. Set the access panel and hardware aside for later use.

**NOTE** *A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conductor.*

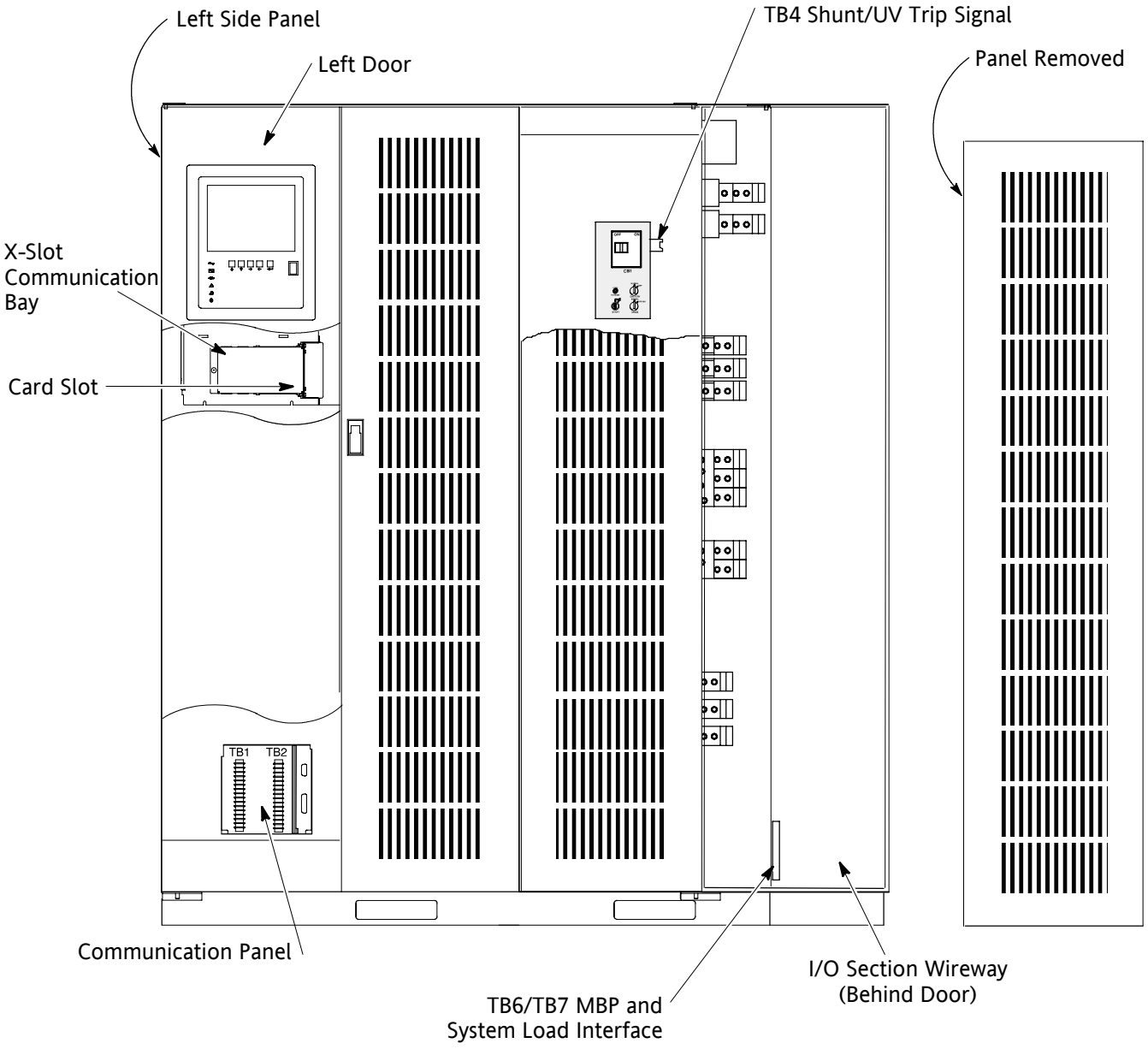


**Figure 3-3. Preparing the UPS for Installation**

**NOTE** *A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conducter.*

## 3.3 Completing the Installation Checklist

The final step in installing the UPS system is completing the following installation checklist. This checklist ensures that you have completely installed all hardware, cables, and other equipment. Completing all items listed on the checklist will ensure a smooth installation. You should make a copy of the installation checklist before filling it out, and retain the original.

After the installation is complete, your Eaton service representative will be able to verify the operation of the UPS system and commission it to support the critical load. The service representative cannot perform any installation tasks other than verifying software and operating setup parameters and installing an optional external modem or internal X-Slot Modem Card. Service personnel may request a copy of the completed installation checklist to be sure you have completed all applicable equipment installation.

**NOTE** *The installation checklist MUST be completed before starting the UPS system for the first time.*

## Installation Checklist

- ❑ All packing materials and restraints have been removed from each cabinet.
- ❑ Each cabinet in the UPS system is placed in its installed location.
- ❑ A ground bond is installed between any cabinets that are bolted together.
- ❑ All switchboards, conduits, and cables are properly routed to the UPS and auxiliary cabinets.
- ❑ All power cables are properly terminated.
- ❑ A ground conductor is properly installed.
- ❑ If neutral connection is used, no other N-G bonds exist downstream from the UPS.
- ❑ Battery cables and harness are terminated on E4 and E5.
- ❑ Internal battery cabinet connections have been completed (bus bars, plugs, etc.).
- ❑ Shunt trip signal wiring is connected from the UPS to battery breaker(s).
- ❑ Air conditioning equipment is installed and operating correctly.
- ❑ The area around the installed UPS system is clean and dust-free. (It is recommended that the UPS be installed on a sealed, concrete pad or a sealed, concrete floor.)
- ❑ Adequate workspace exists around the UPS and other cabinets.
- ❑ Adequate lighting is provided around all UPS equipment.
- ❑ A 120V service outlet is located within 7.6m (25 ft) of the UPS equipment.
- ❑ Each Remote Monitor Panel (RMP) is mounted in its installed location. (OPTIONAL)
- ❑ The control wiring for each RMP is terminated inside the UPS cabinet. (OPTIONAL)
- ❑ The Remote EPO device is mounted in its installed location and its wiring terminated inside the UPS cabinet. (OPTIONAL)
- ❑ Summary alarms and/or building alarms are wired appropriately. (OPTIONAL)
- ❑ A RIM is mounted in its installed location and its wiring is terminated inside the UPS cabinet. (OPTIONAL)
- ❑ A remote battery disconnect control is mounted in its installed location and its wiring is terminated inside the UPS and battery cabinet. (OPTIONAL)
- ❑ System Load Sync Control is mounted in its installation location and wired appropriately. (OPTIONAL)
- ❑ Maintenance Bypass is mounted in place and wired appropriately. (OPTIONAL)
- ❑ Circuit breakers with adjustable trip mechanisms are adjusted to match site requirements.

## Notes

# Chapter 4 | Installing Battery Cabinets

This chapter describes installing the UPS manufacturer's battery cabinets. If you are installing battery cabinets and remote disconnects provided by Powerware, refer to the *Powerware 9315 Series 685 and 1085 Auxiliary Battery Cabinets Installation Manual* for instructions.

One model is available:  the Series 1085 (1085-mm wide cabinet).

## 4.1 Important Safety Instructions

The installation of battery cabinets should be performed or supervised by personnel knowledgeable of batteries and their associated precautions. Keep unauthorized personnel away from battery cabinets.

Observe these precautions when working on or around battery cabinets:

- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.
- Wear rubber gloves and boots.
- Do not lay tools or metal parts on top of batteries or battery cabinets.
- Disconnect the charging source prior to connecting or disconnecting terminals.
- Determine if the battery is inadvertently grounded. If it is, remove the source of the ground. Any part of a grounded battery can result in electrical shock. The likelihood of such shock is reduced if such grounds are removed during installation and maintenance.
- When replacing batteries, use the same number of sealed, lead-acid batteries.
- Proper disposal of batteries is required. Refer to your local codes for disposal requirements.

**WARNING**

- Do not dispose of battery or batteries in a fire. The battery may explode.
- Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes, and may be toxic.
- A battery can cause electrical shock, burn from high short-circuit current, or fire. Take proper precautions when working with batteries.

**AVERTISSEMENT!**

- Une batterie peut prêsenter un risque de choc êlectrique, de brulure, ou d'incendie. Suivre les précautions qui s'imposent.
- Pour le remplacement, utiliser le même nombre et modéle des batteries.
- L'élimination des batteries est règlementée. Consulter les codes locaux à cet effet.

Consider the following information before installing battery cabinets or remote battery disconnects:

- There is no DC disconnect device within the UPS.
- The DC input to the UPS is only protected by internal fuses F21 and F22.
- The UPS DC disconnect trip signal from TB4, points 1 and 2 (shunt trip) or TB4, points 1 and 3 (UV trip) must be connected to the DC source disconnect device(s).
- If you are installing battery cabinets not provided by Powerware, refer to the battery cabinet manufacturer's operating manual for instructions on battery cabinet installation and maintenance.

## 4.2 Recycling the Used Battery or UPS

Contact your local recycling or hazardous waste center for information on proper disposal of the used battery or UPS.

**WARNING**

- Do not dispose of the battery or batteries in a fire. Batteries may explode. Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

**CAUTION**

Do not discard the UPS or the UPS batteries in the trash. This product contains sealed, lead-acid batteries and must be disposed of properly. For more information, contact your local recycling/reuse or hazardous waste center.

**CAUTION**

Do not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

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# Chapter 5 | Installing Input and Output Transformers

Before installing optional input and output transformers, be sure you have prepared the UPS according to the instructions in Chapter 3, “Installing the UPS.” The input and output transformer cabinets arrive as shown in Figure 5-1 through Figure 5-3. See Appendix A for cabinet dimensions.

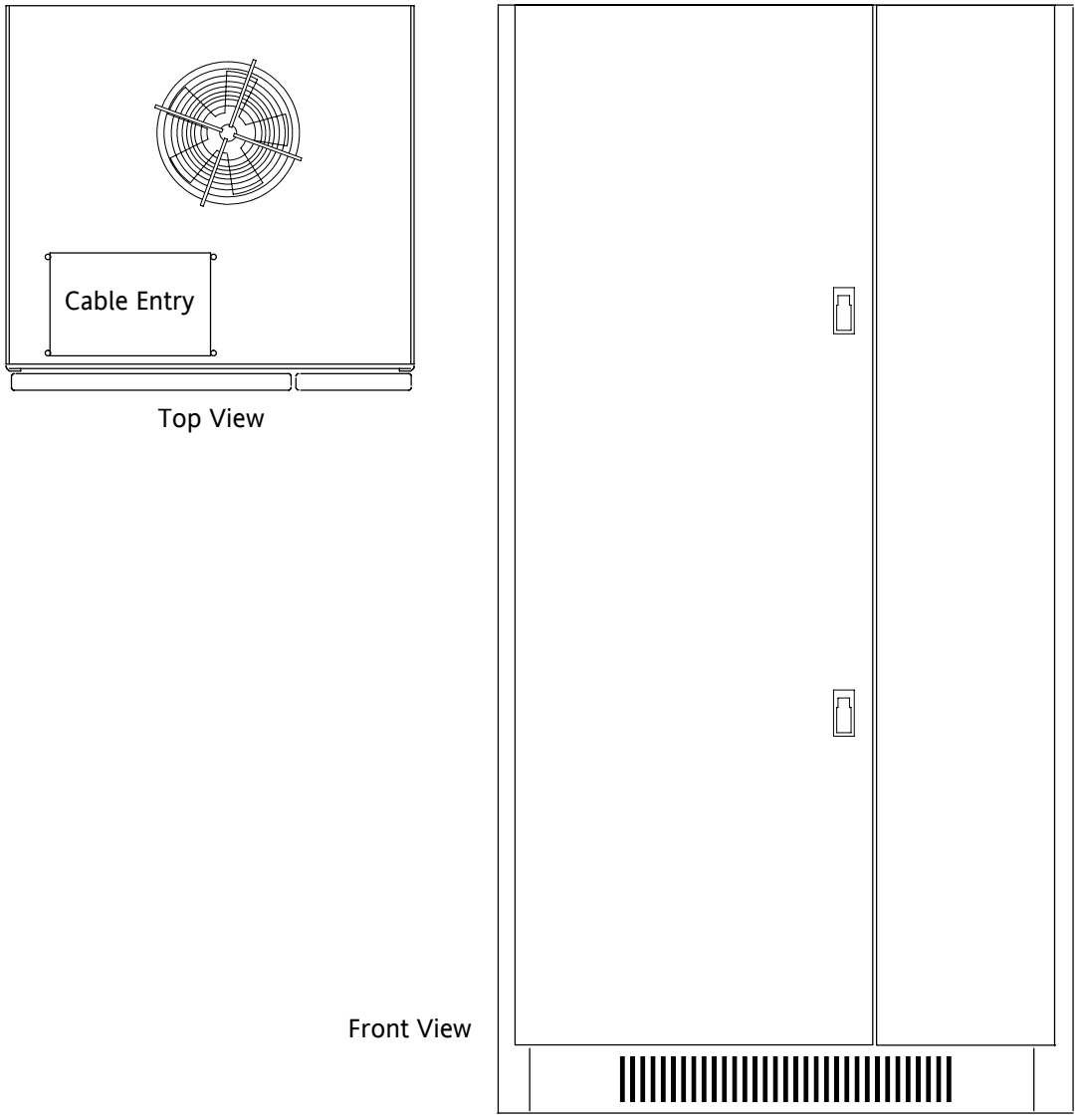


**Figure 5-1. Input Transformer Cabinet**

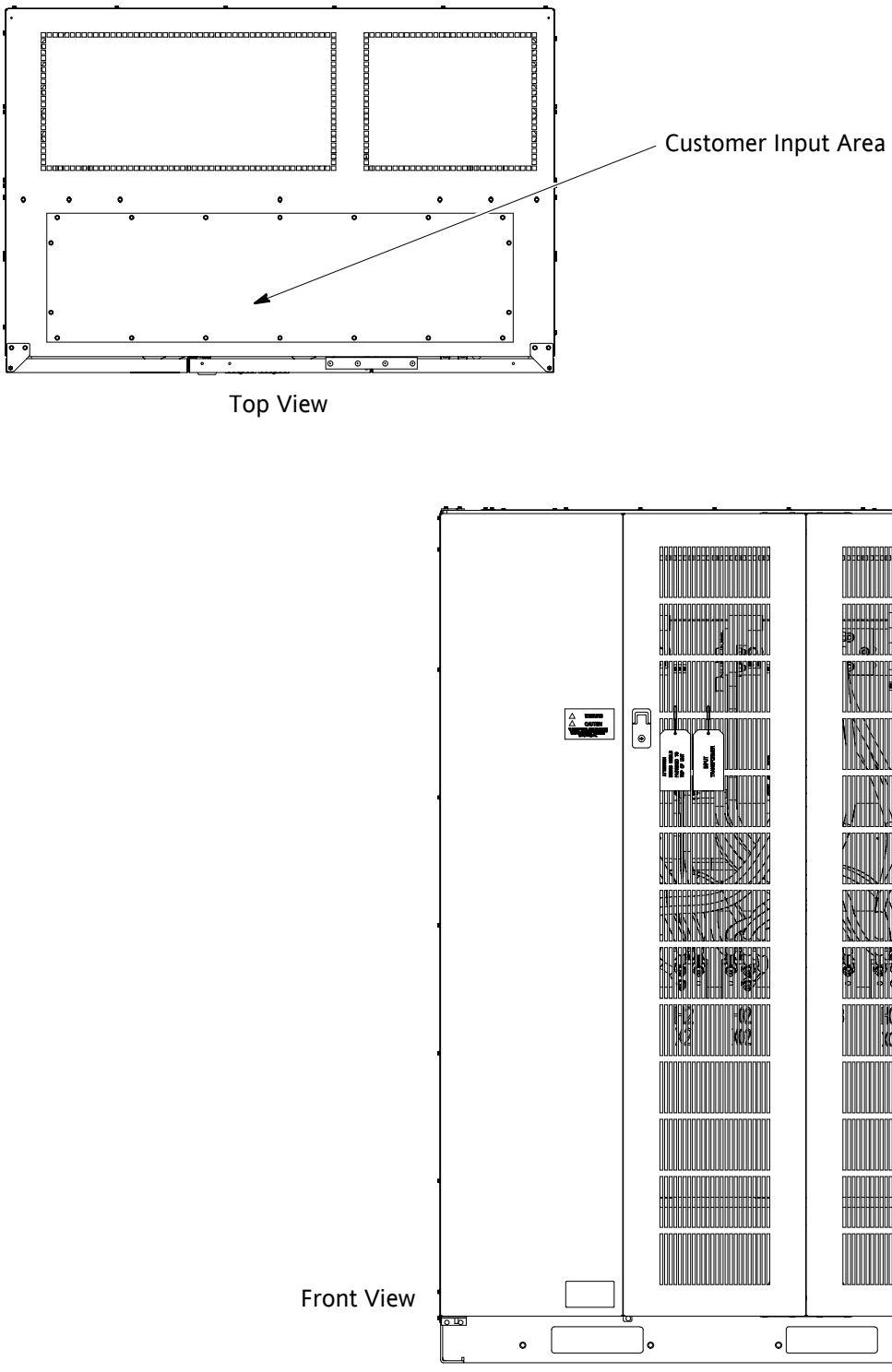


**Figure 5-2. Input Transformer Cabinet (208/480V)**

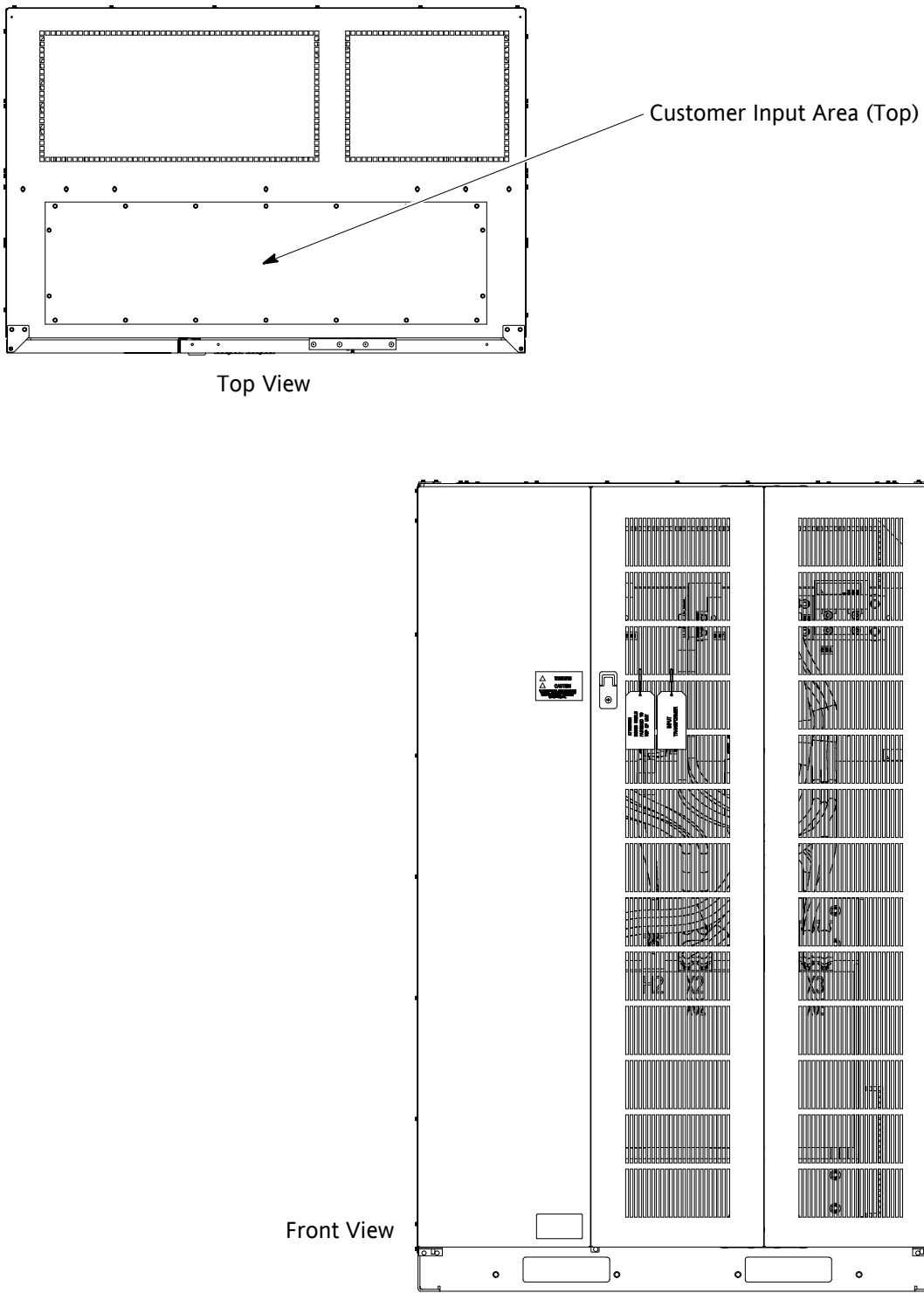


**Figure 5-3. Output Transformer Cabinet (480/208V)**

To prepare the input and output transformer cabinets for wiring to the UPS:

1. Install the UPS into final operating position.
2. Install the cabinets into final operating position and secure.
3. Attach a ground conductor from the cabinets to the closest ground bus.

To wire the input transformer cabinet (single-feed):

**NOTE** *For wiring information, see drawing 164201037-1, Table A through Table E, in Appendix A.*

1. Install wiring from utility to the input transformer cabinet using conduit through the cable entry panel in the top of the cabinet.
2. Install the wiring from input transformer cabinet to the UPS cabinet using conduit through the cable entry panels in the top or bottom of the UPS.
3. Connect the cables as shown in Table 5-1. See Figure 5-4 through Figure 5-5 for the location of connection points within the cabinets.

**Table 5-1. Input Transformer Connection Points (Single Feed)**

| Connection Point in Transformer Cabinet | | | Connection point in UPS |
|---|---|---|---|
| Phase | Input | Output | |
| ∅ A | E23 | E26 | E1 |
| ∅ B | E24 | E27 | E2 |
| ∅ C | E25 | E28 | E3 |
| Neutral | E22 | E29 | E12 |

4. Close the UPS cabinet and the input transformer cabinet doors.

To wire the input transformer cabinets (dual-feed):

**NOTE** *For wiring information, see drawing 164201037-1, Table A through Table E, in Appendix A.*

1. Install wiring from utility to the input transformer cabinets using conduit through the cable entry panel in the top of cabinets.
2. Install wiring from the input transformer cabinets to the UPS cabinet using conduit through the cable entry panels in the top of the UPS.
3. Connect the cables as shown in Table 5-2 and Table 5-3. See Figure 5-4 through Figure 5-5 for the location of connection points within the cabinets.
4. Close the rectifier input transformer cabinet doors and the bypass input transformer cabinet doors.

**Table 5-2. Rectifier Input Transformer Connection Points (Dual Feed)**

| Connection Point in Transformer Cabinet | | | Connection Point in UPS |
|---|---|---|---|
| Phase | Input | Output | |
| ∅ A | E23 | E26 | E1 |
| ∅ B | E24 | E27 | E2 |
| ∅ C | E25 | E28 | E3 |
| Neutral | E22 | E29 | E12 |

**Table 5-3. Bypass Input Transformer Connection Points (Dual Feed)**

| Connection Point in Transformer Cabinet | | | Connection Point in UPS |
|---|---|---|---|
| Phase | Input | Output | |
| ∅ A | E23 | E26 | E6 |
| ∅ B | E24 | E27 | E7 |
| ∅ C | E25 | E28 | E8 |
| Neutral | E22 | E29 | E12 |

To wire the output transformer cabinet:

**NOTE** *For wiring information, see drawing 164201037-1, Table B, Table D, and Table E in Appendix A.*

1. Install wiring from the UPS cabinet to the transformer cabinet using conduit through the cable entry panel in the top of cabinet.
2. Install wiring from the input transformer cabinet to the UPS cabinet using conduit through the cable entry panels in the top of the UPS.
3. Connect the cables as shown in Table 5-4. See Figure 5-6 on page 5-8 for the location of connection points within the transformer cabinets.

**Table 5-4. Output Transformer Connection Points**

| Connection Point in Transformer Cabinet | | | Connection point in UPS |
|---|---|---|---|
| Phase | Input | Output | |
| ∅ A | E23 | E26 | E9 |
| ∅ B | E24 | E27 | E10 |
| ∅ C | E25 | E28 | E11 |
| Neutral | E29 | E29 | E12 |

4. Close the UPS cabinet doors and the output transformer cabinet door.

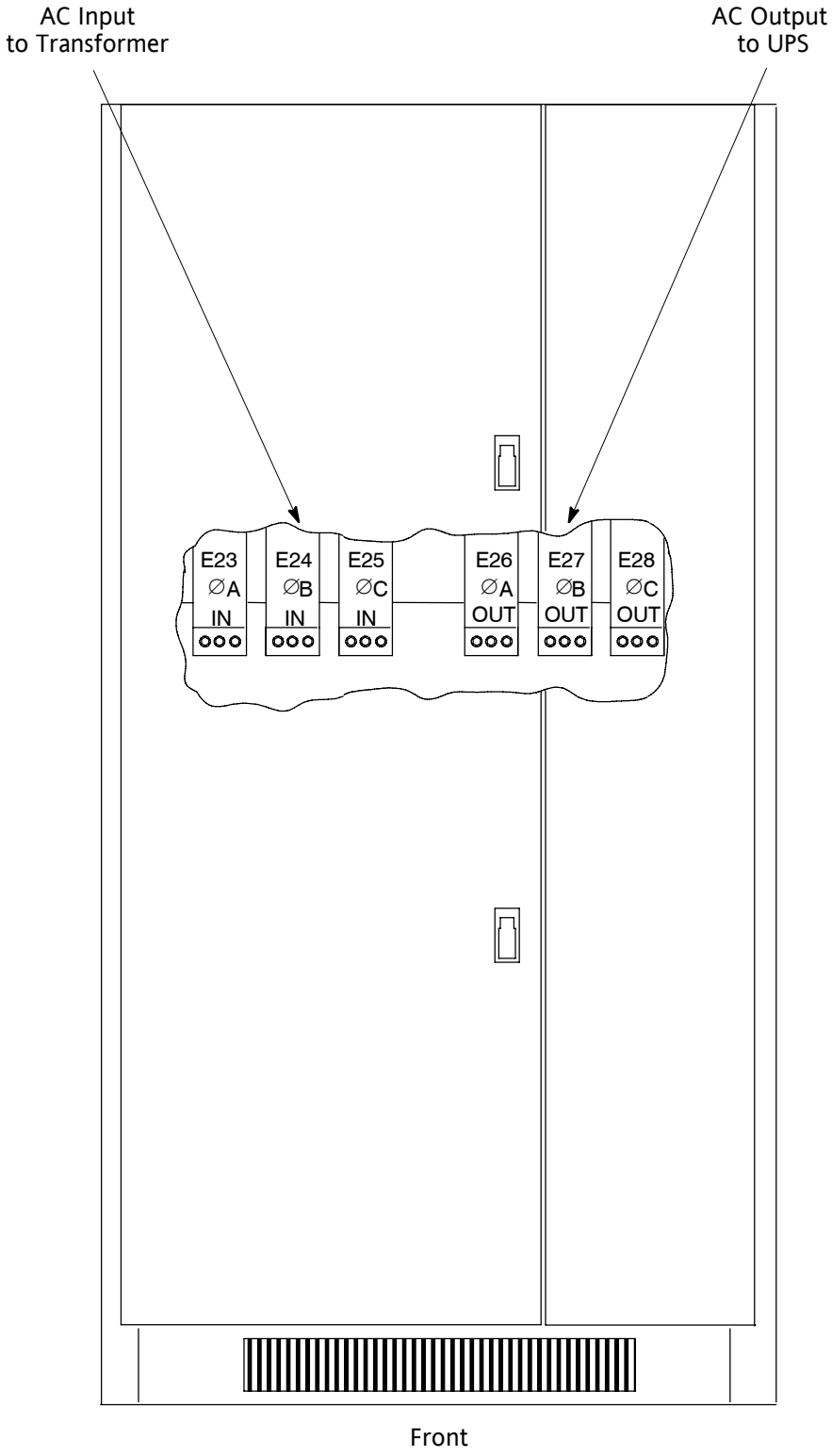


**Figure 5-4. Installing an Input Transformer Cabinet**

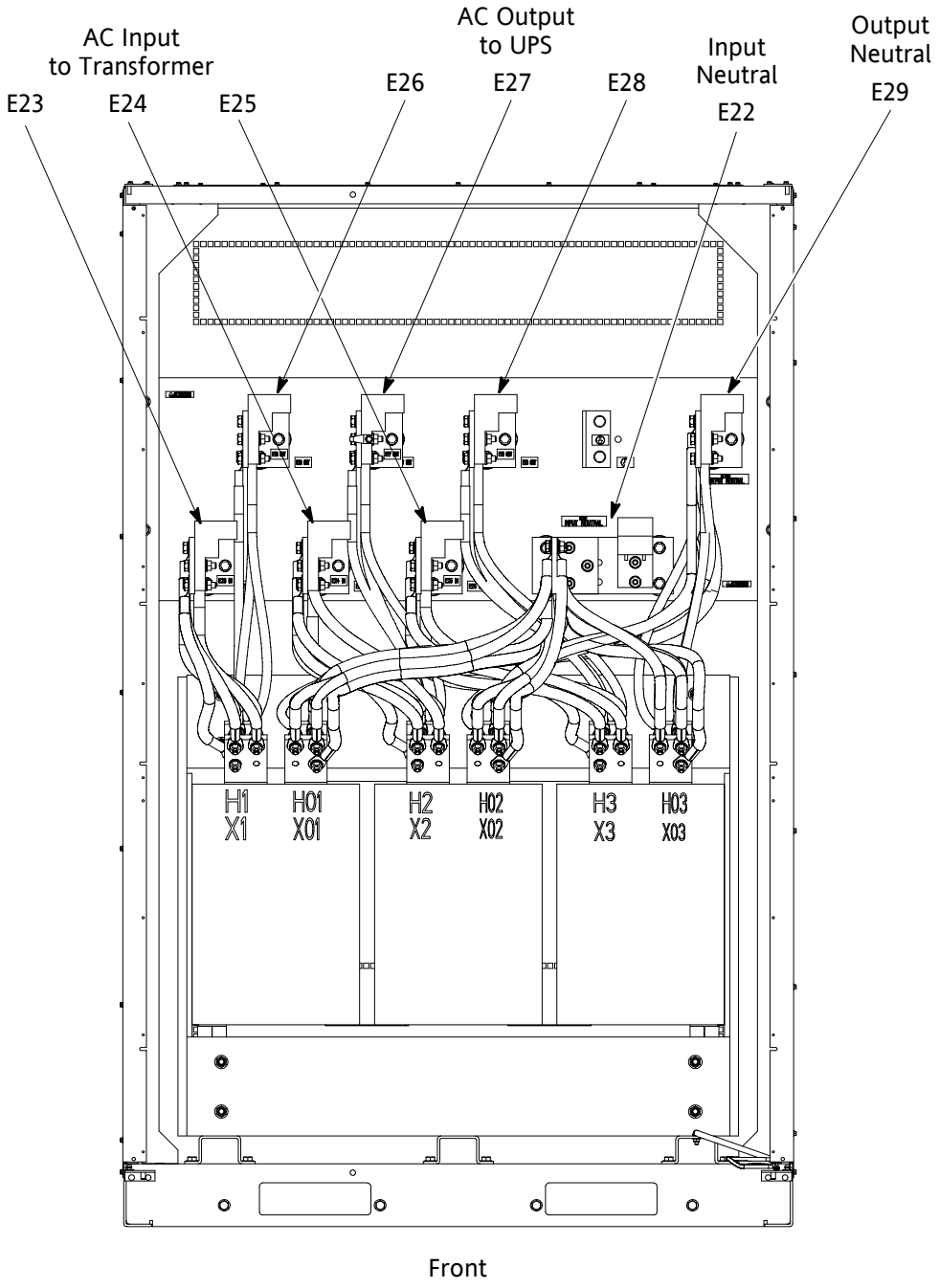


**Figure 5-5. Installing a 208/480 Vac Input Transformer Cabinet**

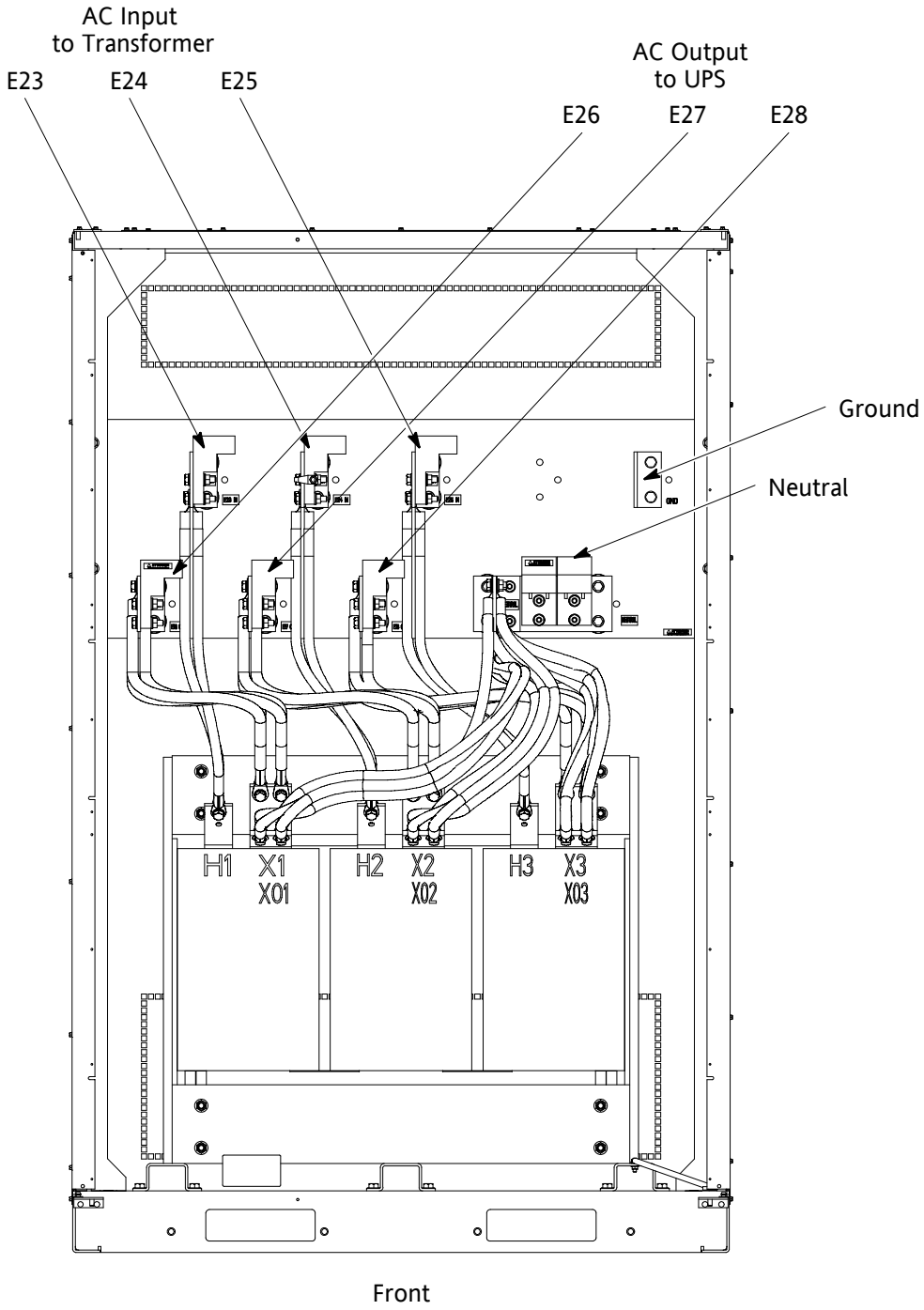


**Figure 5-6. Installing a 480/208 Vac Output Transformer Cabinet**

# Chapter 6 | Installing a Power Distribution Module

The PDM cabinet has one or two panels, each containing up to 42 poles for breaker switches. This arrangement provides flexibility for the needs of your facility. Each panel is controlled by one 225A feeder breaker. The PDM cabinet arrives as shown in Figure 6-1 and Drawing 164201037-8 on page A-31. Before installing the PDM, be sure you have prepared the UPS according to the instructions in Chapter 3. Refer to the *Powerware Power Distribution Module Installation and Operation Manual* for PDM installation and operation.

**NOTE** *This option requires a UPS with a 208 Vac output.*

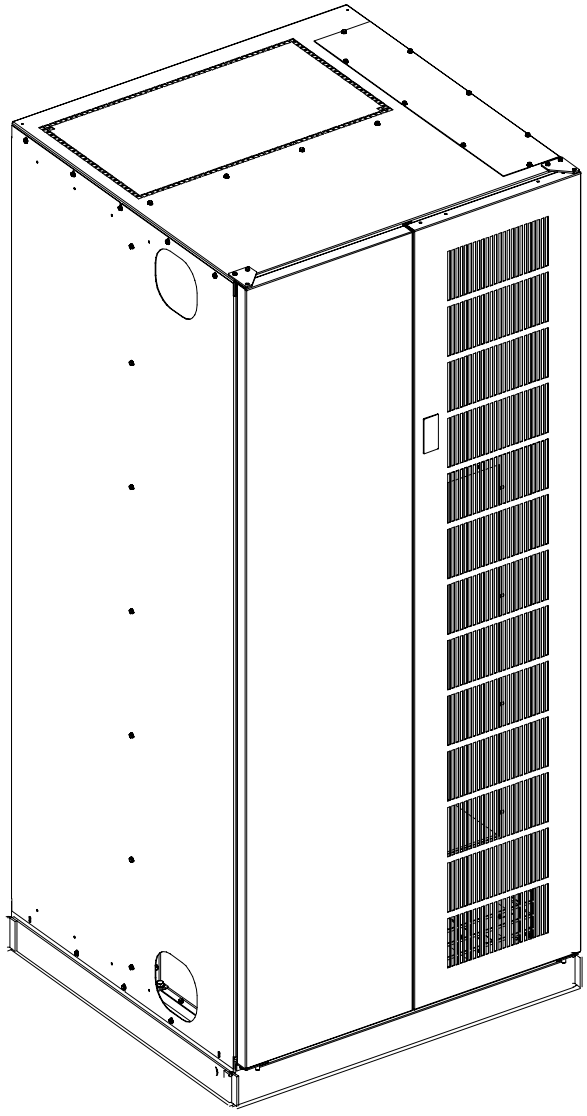

**Figure 6-1. Typical PDM Cabinet**

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# Chapter 7 Installing a Remote Emergency Power-Off

The Remote EPO control arrives as shown in Figure 7-1. For enclosure dimensions, side views, and knockout patterns, see Drawing 164201037-10 on page A-33.

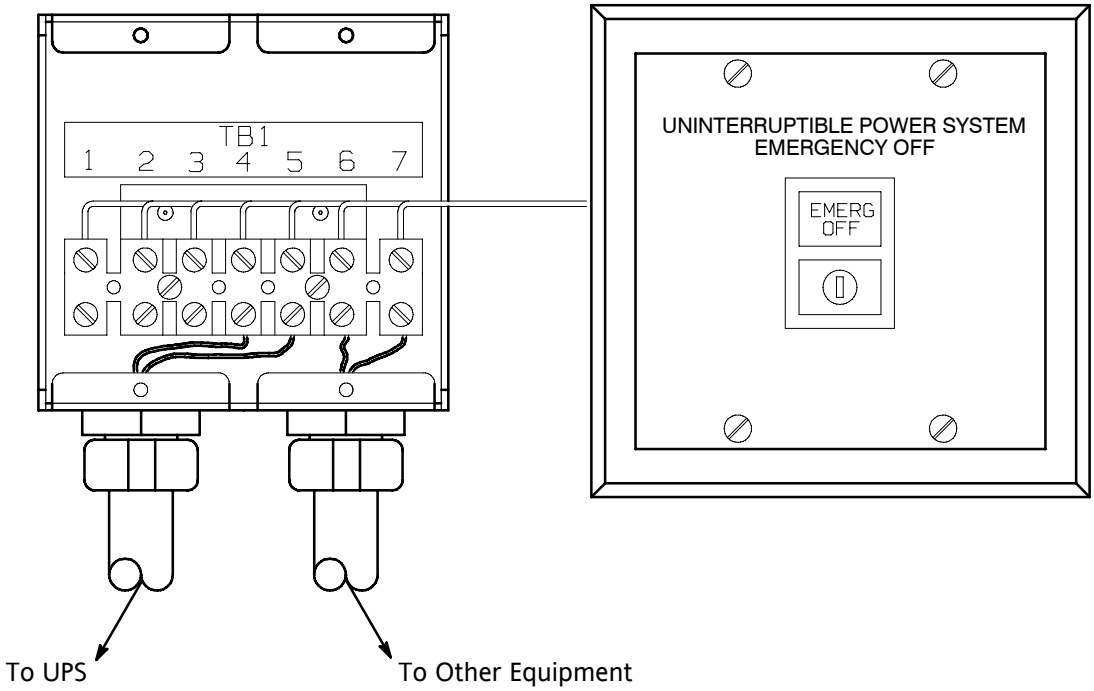


**Figure 7-1. Remote EPO Control**

To install a Remote EPO control:

1. Securely mount the Remote EPO station. Recommended locations include operator's consoles or near exit doors.
2. Install wiring from the Remote EPO station using ½″ conduit through the cable entry panels in either the top or bottom of the UPS.
3. Connect the Remote EPO wiring as shown in Table 7-1 and Figure 7-2:

**Table 7-1. Remote EPO Wire Terminations**

| From Remote EPO Station(s) | To Communication Panel in UPS | Remarks |
|---|---|---|
| TB1-4 | TB2-1 | Twisted wires (2) 14-18 gauge |
| TB1-5 | TB2-2 | |

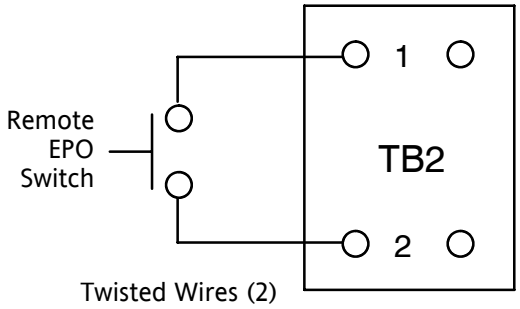


**Figure 7-2. Remote EPO**

**NOTE** *Remote EPO switch rating is 24 Vdc, 1A minimum if supplied by user.*

**NOTE** *This switch must be a dedicated switch not tied into any other circuits.*

4. If you are installing multiple Remote EPO stations, wire additional stations in parallel with the first Remote EPO.
5. If required, install ½″ conduit and wiring from the Remote EPO station to trip circuitry of upstream protective devices. A normally-open contact is provided, as shown in Figure 7-2. Remote EPO switch wiring must be in accordance with UL Class II requirements.
6. Secure the UPS by reversing all steps taken to prepare it for Remote EPO installation.

# Chapter 8 Installing a Remote Battery Disconnect

The remote battery disconnect is crated separately for shipping. The enclosure is designed to be wall-mounted on a surface that can support the weight and bolt pattern. You can install a remote battery disconnect anywhere between the remote DC supply and the UPS, according to national and local codes. Figure 8-1 shows a typical remote battery disconnect enclosure.

The breaker switch on the remote battery disconnect should be set to the ON position for normal UPS operation when DC power is available at the UPS. When service personnel are performing maintenance on the UPS or battery cabinet, the switch should be set to the OFF position.

Consider the following information before installing the remote battery disconnect:

- There is no DC disconnect device within the UPS.
- The DC input to the UPS is only protected by internal fuses F21 and F22.
- The UPS DC disconnect trip signal from TB4, points 1 and 2 (shunt trip) or TB4, points 1 and 3 (UV trip) must be connected to the DC source disconnect device(s).
- For battery switch dimensions, see Drawing 164201037-14 on page A-38.

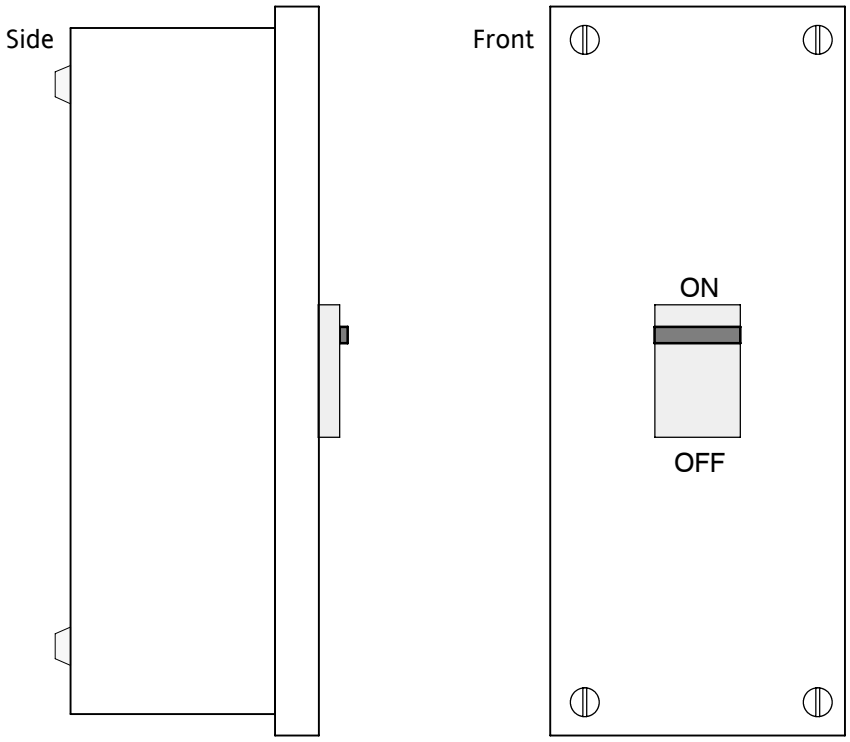


**Figure 8-1. Remote Battery Disconnect Enclosure**

- For specific ratings and wiring requirements, see Table T on page A-18.
- The material and labor for external wiring requirements is to be supplied by others.
- The knockout pattern for the K1200 breaker is determined by others at the time of installation.
- Power cables and control wiring must be installed in separate conduit.
- The ground conductor is to be sized per NEC Article 250 and local electrical code requirements.
- The maximum current listed is at the minimum DC operating voltage.
- Nominal voltages listed in this chapter are for a lead-acid battery plant rated per NEC at 2.0 Vdc per cell.
- Battery cabinets must be installed in accordance with all applicable codes and regulations, including the NEC Article 480.
- The UPS to battery cable should be sized for a total maximum voltage drop of 1% nominal DC link voltage at maximum current.
- Table 8-1 details the power cable terminations.
- The remote battery disconnect weighs approximately 34 kg (75 lb). It has an ampere interrupting capacity (AIC) of 22,000 at 500 Vdc.
- Tightening Torque: 28.7–31.1 Nm (255–275 lb-in)
  Internal Drive Hex Size: 5/16″

**Table 8-1. Remote Battery Disconnect Power Terminations**

| Terminal | Size of Pressure Termination | Terminal Function |
|---|---|---|
| E4 (+) | See Table G on page A-8. | UPS Battery Input (+) |
| E5 (-) | See Table G on page A-8. | UPS Battery Input (-) |
| Breaker (+) | (3) 3/0-500 kcmil | Battery Disconnect (+) |
| Breaker (-) | (3) 3/0-500 kcmil | Battery Disconnect (-) |
| Breaker (jumper) | (3) 3/0-500 kcmil | Battery Disconnect (jumper) |
| Series 1085 Battery Cabinet (+) | (1) 3/0-250 kcmil [Breaker] | Standalone battery cabinet (+) |
| Series 1085 Battery Cabinet (-) | (1) 3/0-250 kcmil [Breaker] | Standalone battery cabinet (-) |

**Table 8-2. Remote Battery Disconnect Circuit Breaker Ratings**

| UPS Model | Circuit Breaker Rating | | DC Voltage |
|---|---|---|---|
| | 0.8 load pF | 0.9 load pF | |
| Powerware 9315 200 | 600 | 700 | 420 |
| Powerware 9315 225 | 600 | 700 | 480 |
| Powerware 9315 250 | 800 | 800 | 420 |
| Powerware 9315 300 | 800 | 1000 | 480 |

# Chapter 9 Installing a Remote Monitor Panel

As an option, you can install an RMP to monitor the operation of the UPS system from virtually any location within your facility, up to 152.4m (500 ft) from the UPS. You can flush-mount or surface-mount an RMP on a desktop or on a wall, wherever you have a serial interface line. A maximum of two monitoring accessories (RMPs, Relay Interface Modules, or Supervisory Contact Modules) can be installed. See Table 9-1 for the number of accessories permitted. Figure 9-1 shows an RMP. Drawing 164201037-11 on page A-34 shows the enclosure dimensions and knockout patterns.

**Table 9-1. Optional Monitoring Accessories**

| Number and Type of Accessories Permitted | | |
|---|---|---|
| Remote Monitor Panel | Relay Interface Module | Supervisory Contact Module |
| 2 | — | — |
| — | 2 | — |
| — | — | 2 |
| 1 | 1 | — |
| 1 | — | 1 |
| — | 1 | 1 |

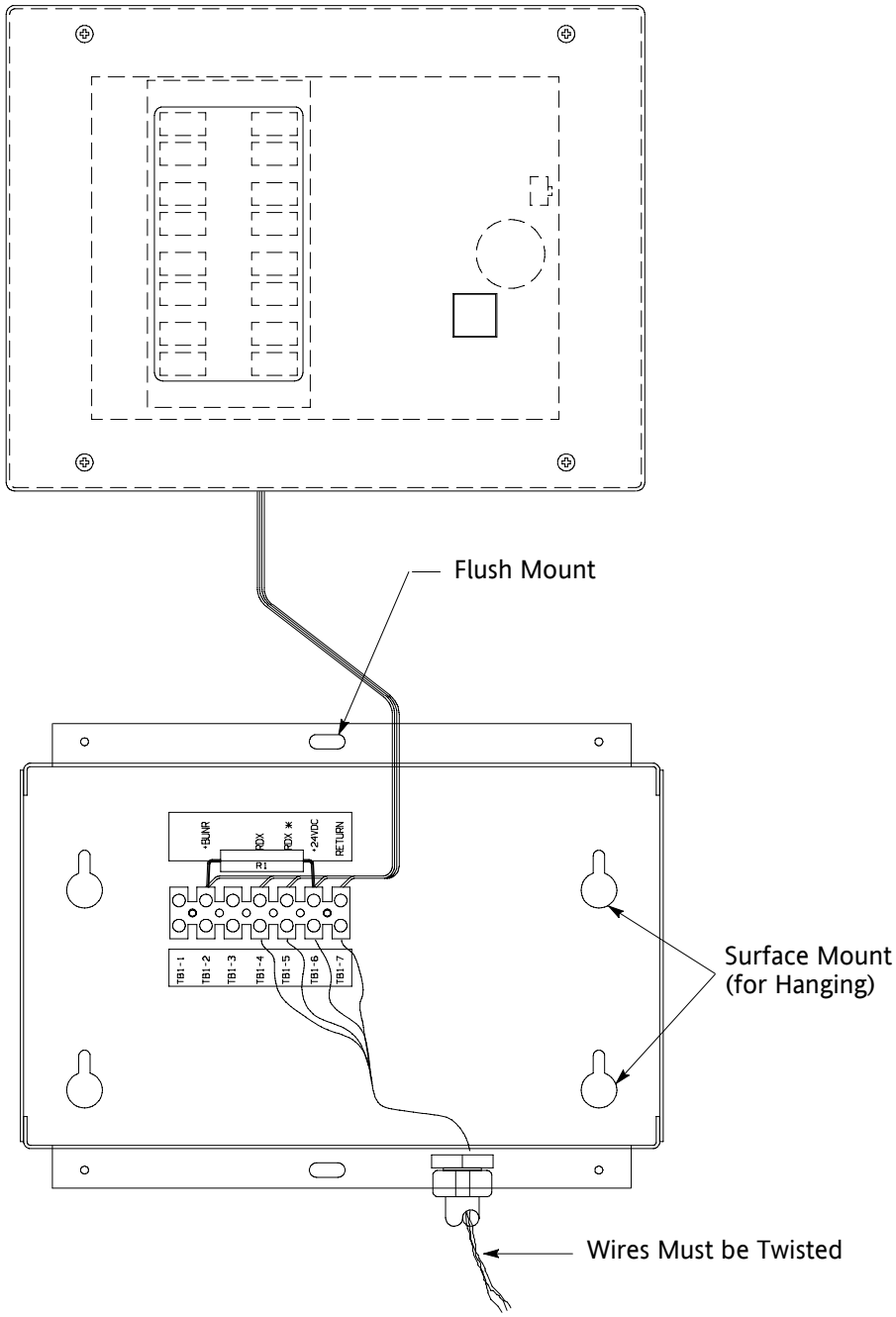


**Figure 9-1. Remote Monitor Panel**

Before installing an RMP, be sure you have prepared the UPS according to the instructions in Chapter 3.

To install an RMP:

1. Securely mount the RMP(s).
2. Install wiring from the RMP using ½″ conduit through the cable entry panels in either the top or bottom of the UPS cabinet.

   The top entry connection requires installation of ½″ flexible conduit within the UPS. Bottom entry connection requires no additional routing of conduit within the UPS.
3. In the spare parts kit, locate the RMP adapter cable assembly (see Figure 9-2). Mate the DB-9 connector on the back of the terminal block into the DB-9 connector on the Communication Panel of the UPS (see Figure 9-3). Use two screws from the spare parts kit to secure the terminal block bracket to the Communication Panel.

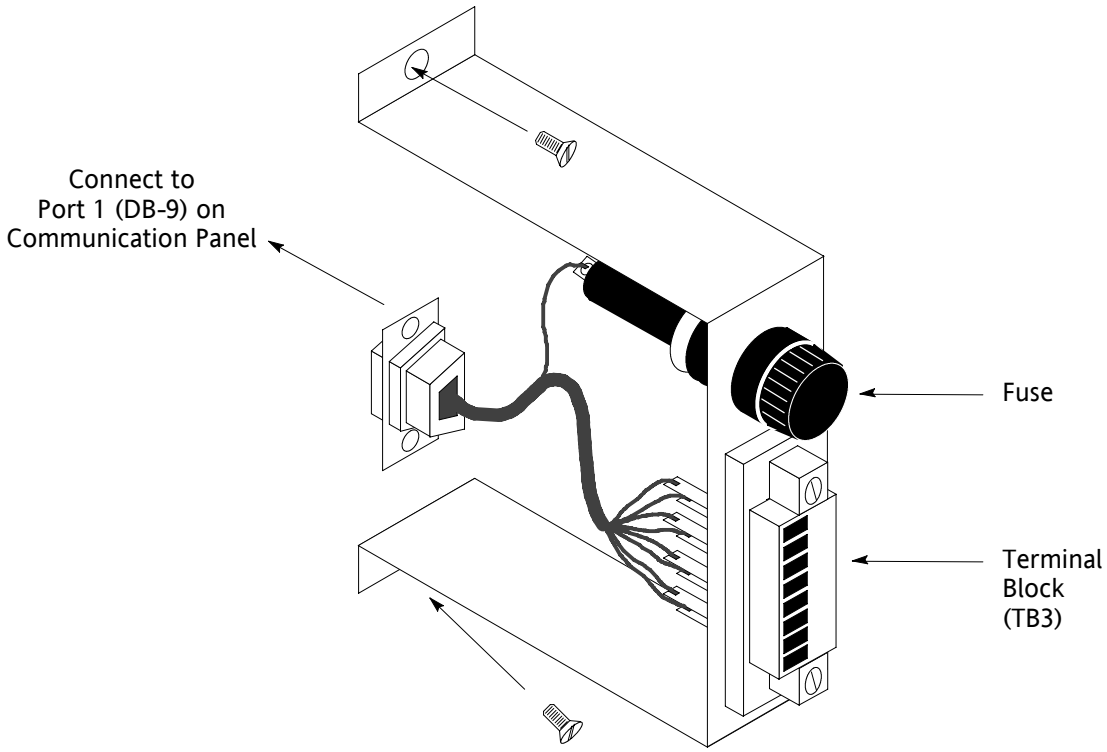


**Figure 9-2. Terminal Block Bracket**

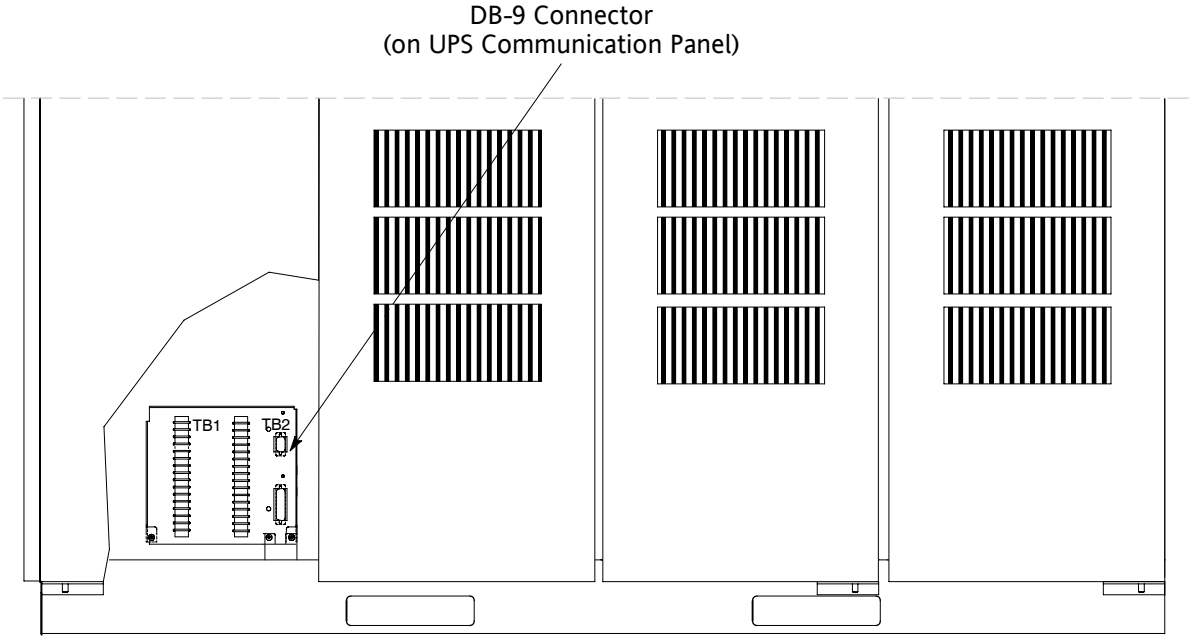


**Figure 9-3. Wiring an RMP to the UPS**

**4.** Connect RMP wiring to the terminal block using terminations shown in Table 9-2.

**Table 9-2. RMP Wire Terminations**

| From RMP A | To UPS | Remarks |
|---|---|---|
| TB1-4 | TB3-1 | Twisted wires (4) 1-2 turns per 3″ |
| TB1-5 | TB3-2 | |
| TB1-6 | TB3-3 | |
| TB1-7 | TB3-4 | |
| **From RMP B (if used)** | **To UPS** | **Remarks** |
| TB1-4 | TB3-5 | Twisted wires (4) 1-2 turns per 3″ |
| TB1-5 | TB3-6 | |
| TB1-6 | TB3-7 | |
| TB1-7 | TB3-8 | |

**5.** To check the operation of the RMP, ensure that the UPS is supplying the load via inverter or bypass. If the indicators on the RMP show the appropriate status, then it is operating correctly.

If the communication link between the UPS and the RMP is not present, the RMP will self-test (all indicators flash and the horn beeps at one-second intervals). If this occurs, check all harness connectors and the fuse for proper seating. If all connections are secure but the RMP continues to self-test, replace the fuse with the spare included in the hardware kit. If this does not correct the problem, contact your Eaton service representative for verification that the RMP is working correctly.

6. To test the indicator lamps, press the horn silence button and hold it for 3 seconds. All lamps should illuminate, and the horn sounds continuously until you release the button.

7. Repeat Steps 1, 2, and 4 through 6 for each RMP you are installing.

8. If you are installing an RIM or SCM in addition to an RMP, proceed to Chapter 10 or 11, respectively; otherwise, secure the UPS cabinet by reversing the steps on page 3-4.

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# Chapter 10 | Installing a Relay Interface Module

The optional RIM uses relay contact closures to indicate the operating status and alarm condition of the UPS system. The module uses an RS-232 serial interface line and may support up to eight critical loads. A maximum of two monitoring accessories (Remote Monitor Panels, RIMs, or Supervisory Contact Modules) can be installed. See Table 9-1 on page 9-1 for the number of accessories permitted. Figure 10-1 shows the RIM with its four 15-pin connectors labeled J1 through J4. Drawing 164201037-12 on page A-35 outlines the enclosure dimensions.

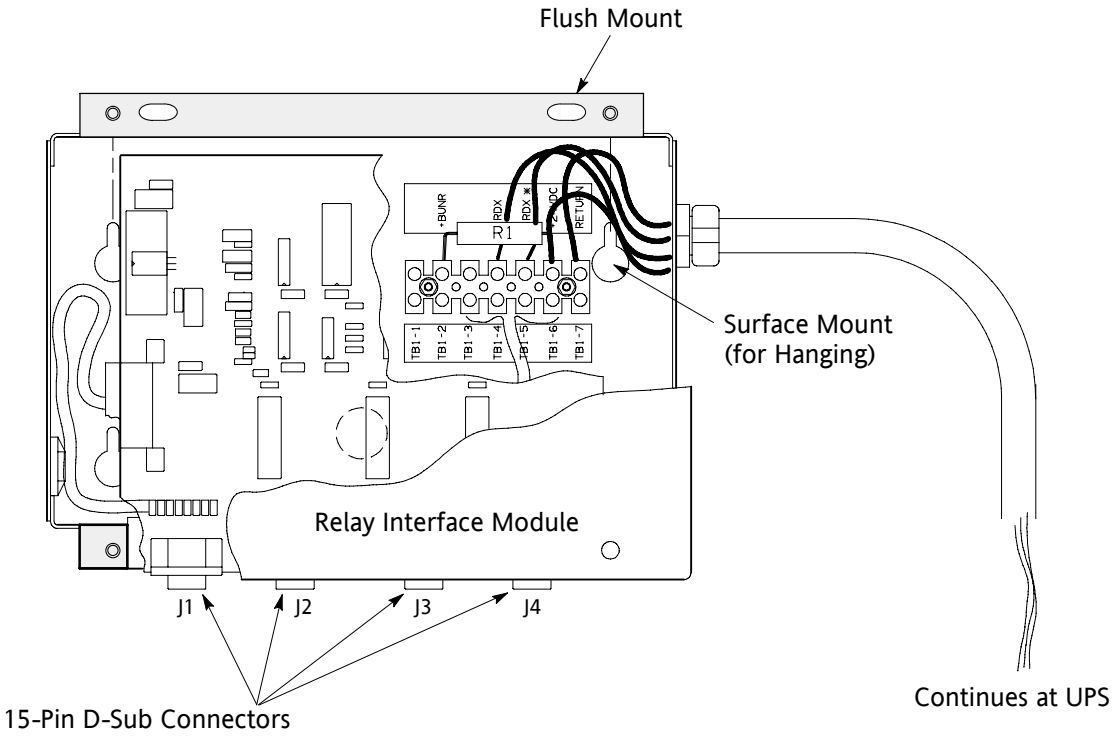


**Figure 10-1. Relay Interface Module**

To install an RIM:

1. Securely mount the RIM.
2. Install wiring from the RIM using ½″ conduit through the conduit entry plate in either the top or bottom of the UPS cabinet.

   The top entry connection requires installation of ½″ flexible conduit within the UPS. Bottom entry requires no additional routing of conduit within the UPS.
3. If not already installed, locate the RMP adapter cable assembly (see Figure 10-2) in the spare parts kit. Mate the DB-9 connector on the back of the terminal block into the DB-9 connector on the Communication Panel of the UPS (see Figure 10-3). Use two screws from the spare parts kit to secure the terminal block bracket to the Communication Panel.

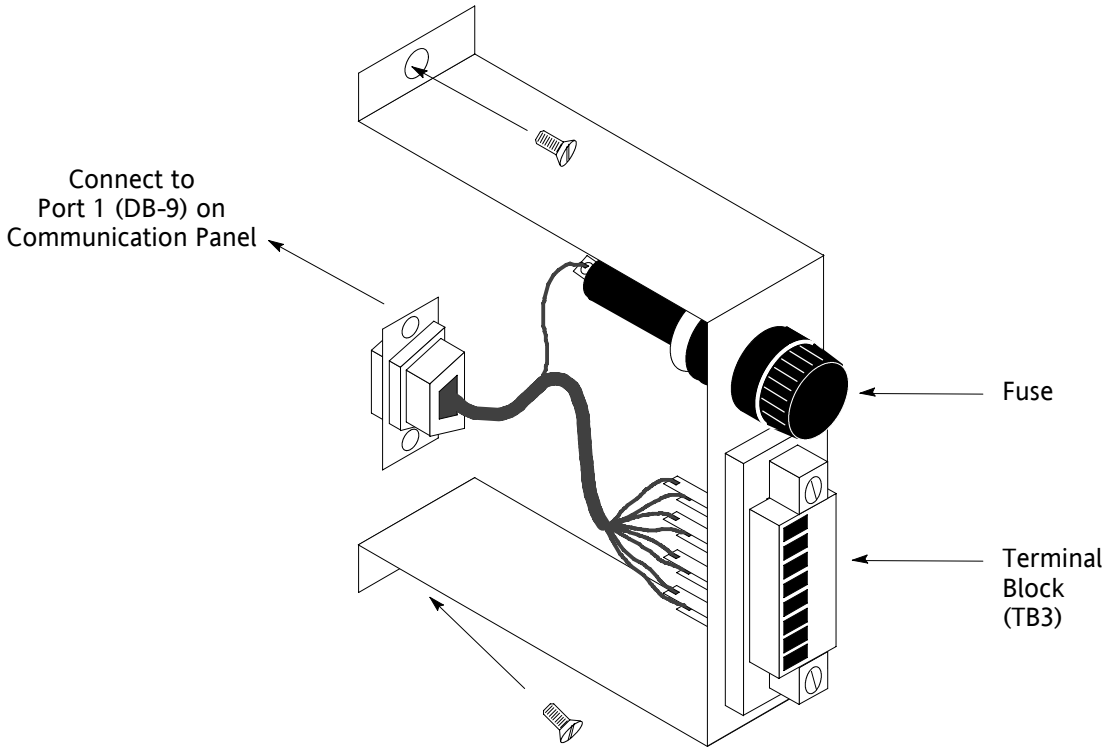


**Figure 10-2. Terminal Block Bracket**

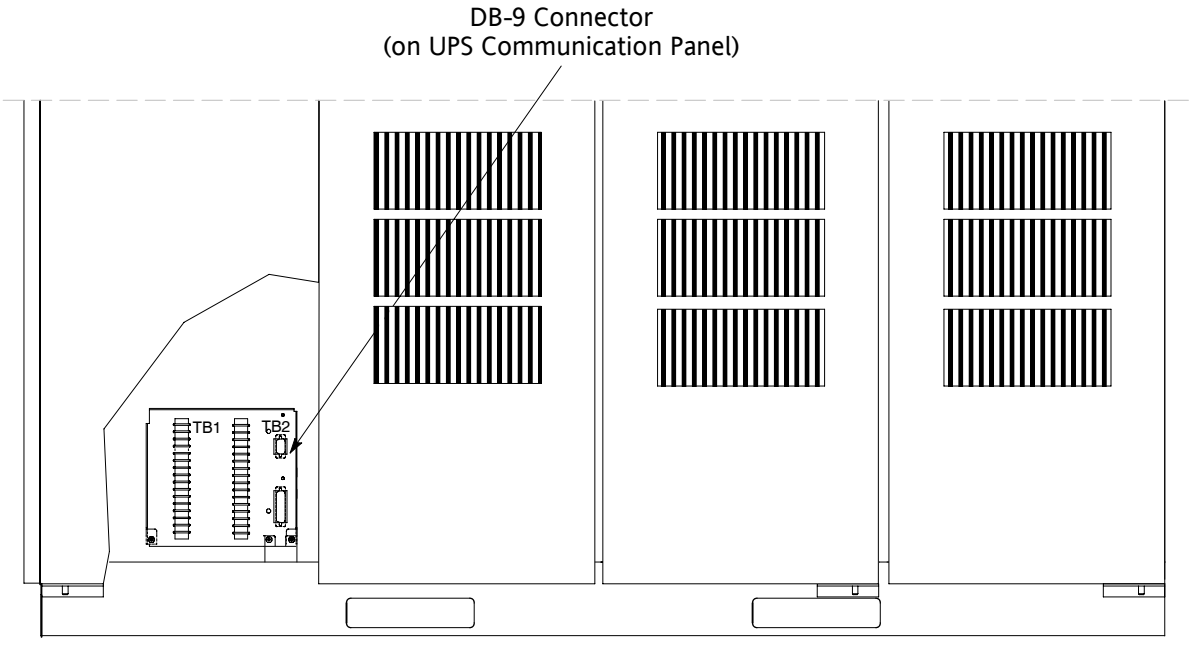


**Figure 10-3. Wiring an RIM to the UPS**

4. Connect RIM wiring to the terminal block using the terminations shown in Table 10-1.

5. Contact your Eaton service representative for verification and testing of the RIM and its connections prior to making connections with J1 through J4.

   You can order interface cables separately for connecting to the 15-Pin D-Sub Connectors.

6. Repeat Steps 1 through 5 for each RIM you are installing.

7. If you are installing an RMP or SCM in addition to an RIM, proceed to Chapter 9 or 11, respectively; otherwise, secure the UPS cabinet by reversing the steps on page 3-4.

**Table 10-1. RIM Wire Terminations**

| From RIM A | To UPS | Remarks |
|---|---|---|
| TB1-4 | TB3-1 | Twisted wires (4) 1-2 turns per 3″ |
| TB1-5 | TB3-2 | |
| TB1-6 | TB3-3 | |
| TB1-7 | TB3-4 | |
| **From RIM B (if used)** | **To UPS** | **Remarks** |
| TB1-4 | TB3-5 | Twisted wires (4) 1-2 turns per 3″ |
| TB1-5 | TB3-6 | |
| TB1-6 | TB3-7 | |
| TB1-7 | TB3-8 | |

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# Chapter 11 | Installing a Supervisory Contact Module

The optional SCM as shown in Figure 11-1 provides contacts for monitoring UPS status. A maximum of two monitoring accessories (Remote Monitor Panels, Relay Interface Modules, or SCMs) can be installed. See Table 9-1 on page 9-1 for the number of accessories permitted. See Drawing 164201037-13 on page A-37 for enclosure dimensions, side views, and knockout patterns.

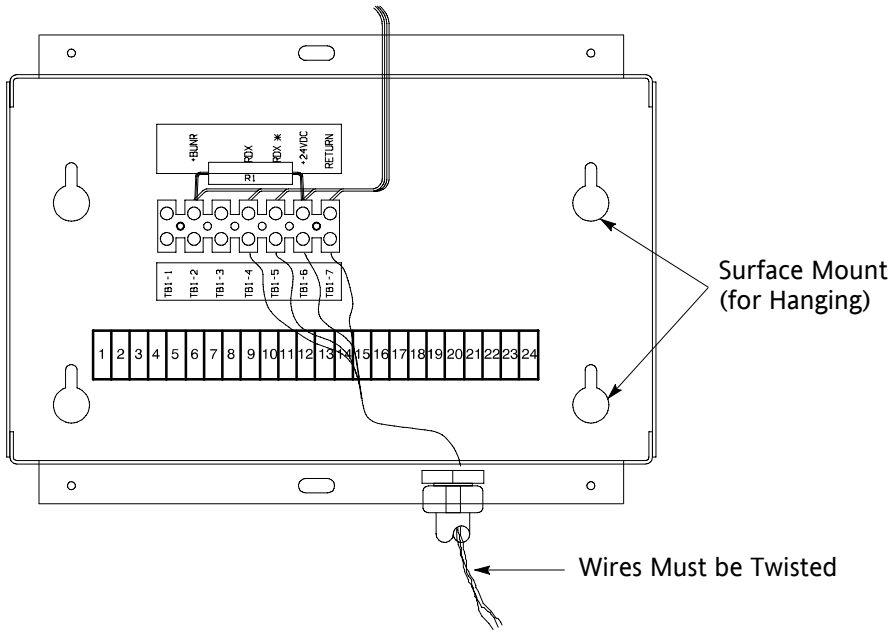



**Figure 11-1. Supervisory Contact Module**

To install a SCM:

1. Securely mount the SCM.
2. Install wiring from the SCM using ½″ conduit through the conduit entry plate in either the top or bottom of the UPS cabinet.

   The top entry connection requires installation of ½″ flexible conduit within the UPS. Bottom entry connection requires no additional routing of conduit within the UPS.
3. If not already installed, locate the RMP adapter cable assembly (see Figure 11-2) in the spare parts kit. Mate the DB-9 connector on the back of the terminal block into the DB-9 connector on the Communication Panel of the UPS (see Figure 11-3). Use two screws from the spare parts kit to secure the terminal block bracket to the Communication Panel.

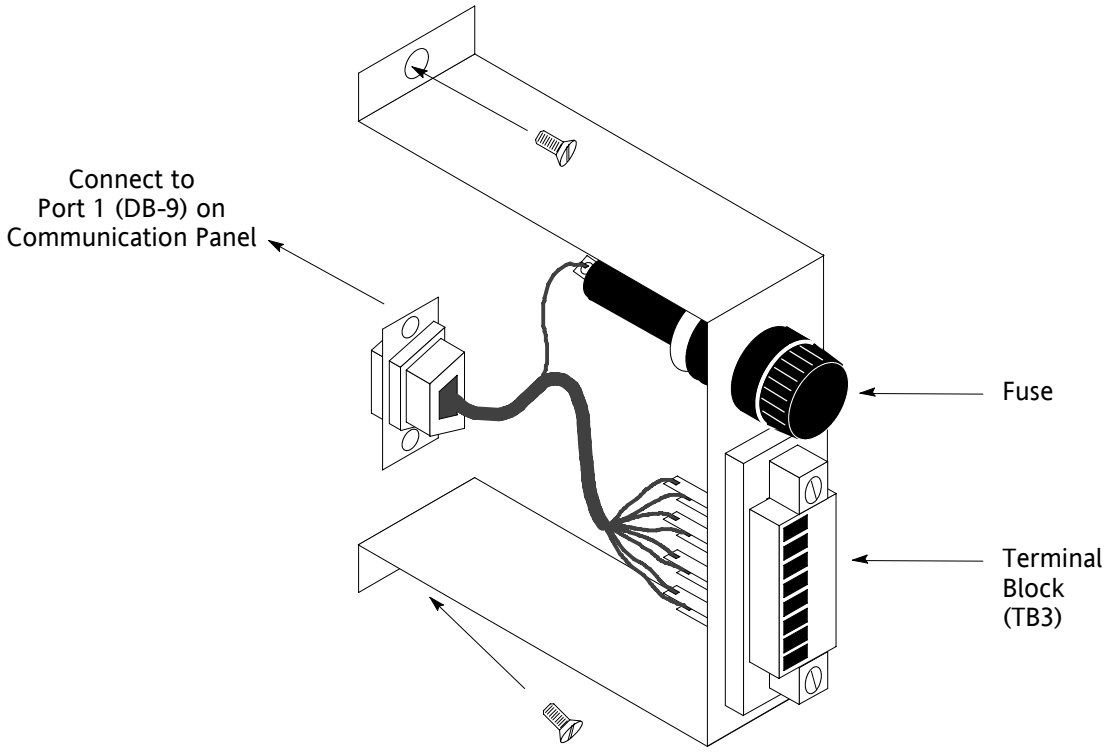



**Figure 11-2. Terminal Block Bracket**

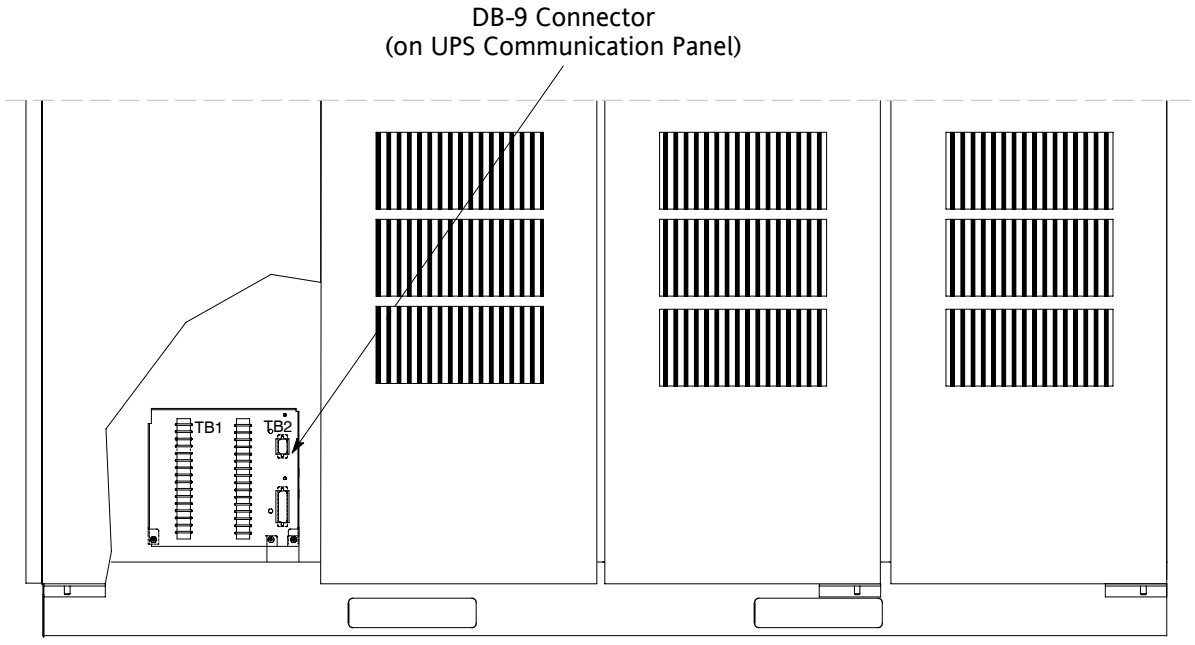



**Figure 11-3. Wiring an SCM to the UPS**

4. Connect the SCM wiring to the terminal block using the terminations shown in Table 11-1.

5. Contact your Eaton service representative for verification and testing of the SCM and its connections prior to making connections to terminal strip shown in Figure 11-4.

6. Repeat Steps 1 through 5 for each SCM you are installing.

7. If you are installing an RMP or RIM in addition to an SCM, proceed to Chapter 9 or 10, respectively; otherwise, secure the UPS cabinet by reversing the steps on page 3-4.

**Table 11-1. SCM Wire Terminations**

| From SCM A | To UPS | Remarks |
|---|---|---|
| TB1-4 | TB3-1 | Twisted wires (4) 1-2 turns per 3″ |
| TB1-5 | TB3-2 | |
| TB1-6 | TB3-3 | |
| TB1-7 | TB3-4 | |
| **From SCM B (if used)** | **To UPS** | **Remarks** |
| TB1-4 | TB3-5 | Twisted wires (4) 1-2 turns per 3″ |
| TB1-5 | TB3-6 | |
| TB1-6 | TB3-7 | |
| TB1-7 | TB3-8 | |

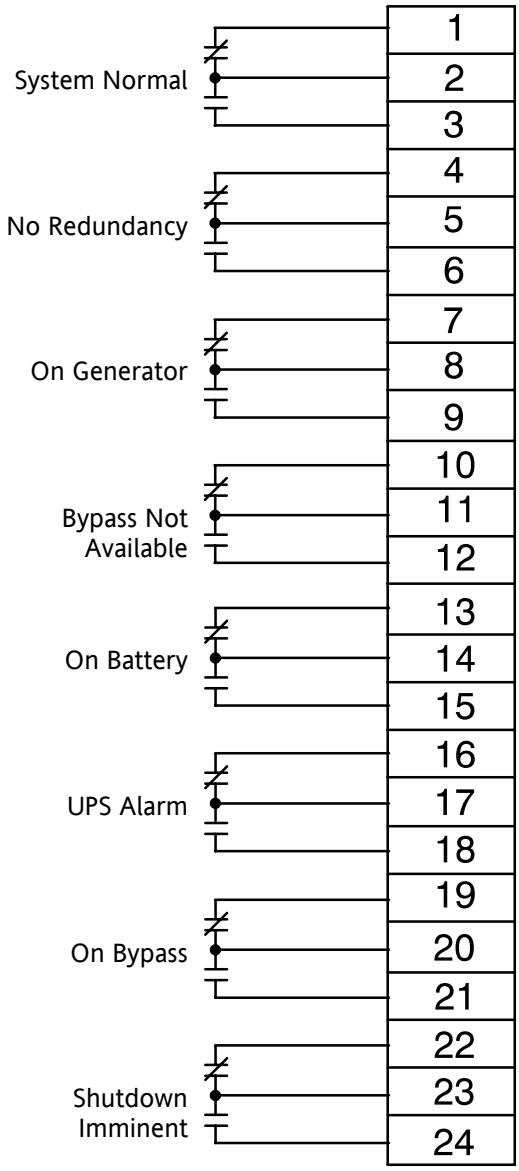



**Figure 11-4. Supervisory Contact Module TB2**

**NOTE** *Supervisory contacts are rated at 2.0A at 28 Vdc or 120 Vac and 0.15A at 115 Vdc.*

**NOTE** *Supervisory contacts require external an power supply. Internal 24 Vdc is not capable of supplying contact current.*

# Appendix A | Customer Information

The information in this appendix will help you plan for and install your UPS system. This appendix contains the following drawings:

- 164201037-1 Installation Notes
- 164201037-2 Typical UPS System
- 164201037-3 UPS System Oneline Configurations
- 164201037-4 Oneline Drawings of UPS System
- 164201037-5 Location of UPS Power Terminals
- 164201037-6 UPS Cabinet
- 164201037-7 Transformer Cabinets
- 164201037-8 Power Distribution Module
- 164201037-9 Maintenance Bypass Module
- 164201037-10 Remote Emergency Power Off
- 164201037-11 Remote Monitor Panel
- 164201037-12 Relay Interface Module
- 164201037-13 Supervisory Contact Module
- 164201037-14 Battery Disconnect Switch

**Table A. INPUT/OUTPUT Ratings & External Wiring Requirements for Powerware 9315 200 and 250 (0.8 pF)**

| *Ratings* | | *Units* | *Rating 60 Hz* | | |
|---|---|---|---|---|---|
| **Basic unit rating at 0.8 lagging PF load** | | Model | 200 | 250 | |
| | | KVA<br>KW | 200<br>160 | 200<br>160 | 250<br>200 |
| | | INPUT/OUTPUT VOLTAGE | 400 | 400 | 400 |
| AC INPUT | **AC Input to UPS Rectifier or Input Transformer**<br>**(.95min.PF)**<br>*3 Ø, 1 gnd*<br>*Minimum conductor size (number per Ø)*<br>*(Maximum amps includes full load current plus battery recharge current)<br>*Minimum conductor size (number per Ø)* Ⓐ | With Filter:<br>Amps*<br>AWG or kcmil(ea)<br>Without Filter:<br>Amps*<br>AWG or kcmil(ea) | <br>317<br>4/0(2)<br><br>360<br>250(2) | <br>317<br>4/0(2)<br><br>360<br>300(2) | <br>397<br>300(2)<br><br>467<br>400(2) |
| AC INPUT | **AC Input to Bypass**<br>*Full Load Current 3 Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓑ | Amps<br>AWG or kcmil(ea) | 290<br>4/0(2) | 290<br>4/0(2) | 360<br>250(2) |
| DC INPUT | **DC Input from Battery to UPS**<br>*(1) positive, (1) negative*<br>*Minimum conductor size (number per Ø)* Ⓒ | VDC<br>Amps @ (1.8V/cell)<br>AWG or kcmil(ea) | 420<br>457<br>400(2) | 420<br>457<br>400(2) | 420<br>571<br>300(3) |
| AC OUTPUT | **AC Output to Critical Load**<br>*Full Load Current 3 Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓓ | Amps<br>AWG or kcmil(ea) | 290<br>4/0(2) | 290<br>4/0(2) | 360<br>250(2) |

Read and understand the following notes while planning your installation:

1. Refer to national and local electrical codes for acceptable external wiring practices.
2. Material and labor for external wiring requirements are to be provided by designated personnel.
3. For external wiring, use 75°C copper wire. See the appropriate column in Table A through Table F. If wire is run in an ambient temperature greater than 30°C, higher temperature and/or larger size wire may be necessary. This product is not rated for aluminum wire.
4. Wire ampacities are chosen from Table 310–16 of the NEC. Wire is 75°C specification.
5. The 208V input isolation transformer is intended for use with UPS units with input filter option only.
6. The neutral conductor is considered to be a current-carrying conductor per Note 10 of the Notes to Ampacity Table 310 of the NEC. If a neutral is used, the wire is derated by 80% per Note 8(a) of the Notes to Ampacity Table 310 assuming 4–6 conductors in a raceway. If there is no neutral, it is assumed that there is only 3 current-carrying conductors in a raceway (one per phase).
7. All circuit breakers provided as part of the UPS system that employ adjustable trip mechanisms have been set to their maximum settings. Based upon the energy available and other equipment located on-site, these settings may need to be adjusted to ensure proper system operation and coordination. It is the customer's responsibility to conduct a breaker coordination study, so that these breakers can be adequately set for the site.

*NOTE:* Callout letters Ⓐ, Ⓑ, Ⓒ, and Ⓓ map to drawing #164201037–3
400V = 380/400/415 Volt

| | | |
|---|---|---|
| *DESCRIPTION:* **INSTALLATION NOTES** | | |
| *DRAWING NO:* 164201037–1 | | *SHEET:* 1 of 17 |
| *REVISION:* E | *DATE:* 113004 | |

**Table B. INPUT/OUTPUT Ratings & External Wiring Requirements for Powerware 9315 225 (0.8 pF)**

| *Ratings* | | *Units* | *Rating 60 Hz* | |
|---|---|---|---|---|
| **Basic unit rating at 0.8 lagging PF load** | | KVA<br>KW | 225<br>180 | |
| | | INPUT/OUTPUT VOLTAGE | 208 | 480 |
| AC INPUT | **AC Input to UPS Rectifier or Input Transformer (.95min.PF)**<br>*3 Ø, 1 gnd*<br>*Minimum conductor size (number per Ø)*<br>*(Maximum amps includes full load current plus battery recharge current)<br>*Minimum conductor size (number per Ø)* Ⓐ | With Filter: | | |
| | | Amps* | 721 | 312 |
| | | AWG or kcmil(ea) | 500(3) | 4/0(2) |
| | | Without Filter: | | |
| | | Amps* | 800 | 360 |
| | | AWG or kcmil(ea) | 500(3) | 250(2) |
| AC INPUT | **AC Input to UPS Rectifier from Input Transformer (.95min.PF)**<br>*3 Ø, 1 gnd*<br>*Minimum conductor size (number per Ø)*<br>*(Maximum amps includes full load current plus battery recharge current)<br>*Minimum conductor size (number per Ø)* Ⓔ | With Filter: | | |
| | | Amps* | 312 | N/A |
| | | AWG or kcmil(ea) | 4/0(2) | N/A |
| | | Without Filter: | | |
| | | Amps* | 360 | N/A |
| | | AWG or kcmil(ea) | 250(2) | N/A |
| AC INPUT | **AC Input to Bypass**<br>*Full Load Current 3 Ø, (1) Neutral, (1) gnd Minimum conductor size (number per Ø)* Ⓑ | Amps | 625 | 271 |
| | | AWG or kcmil(ea) | 350(3) | 3/0(2) |
| DC INPUT | **DC Input from Battery to UPS**<br>*(1) positive, (1) negative*<br>*Minimum conductor size (number per Ø)* Ⓒ | VDC<br>Amps @ (1.8V/cell) | 480<br>450 | 480<br>450 |
| | | AWG or kcmil(ea) | 400(2) | 400(2) |
| AC OUTPUT | **AC Output to Critical Load**<br>*Full Load Current 3 Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓓ | Amps | 625 | 271 |
| | | AWG or kcmil(ea) | 350(3) | 3/0(2) |

*NOTE:* Callout letters Ⓐ, Ⓑ, Ⓒ, Ⓓ, and Ⓔ map to drawing #164201037–3

| | | |
|---|---|---|
| *DESCRIPTION:* **INSTALLATION NOTES** | | |
| *DRAWING NO:* 164201037–1 | *SHEET:* 2 of 17 | |
| *REVISION:* E | *DATE:* 113004 | |

| Table C. INPUT/OUTPUT Ratings & External Wiring Requirements for Powerware 9315 300 (0.8 pF) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***Ratings*** | | ***Units*** | ***Rating 60 Hz*** | | | | |
| **Basic unit rating at 0.8 lagging PF load** | | KVA<br>KW | 225<br>180 | | 300<br>240 | | |
| | | INPUT/OUTPUT VOLTAGE | 480 | 600 | 208 | 480 | 600 |
| AC INPUT | **AC Input to UPS Rectifier or Input Transformer (0.95min.PF)**<br>*3Ø, 1 Neutral, 1 gnd*<br>*Minimum conductor size (number per Ø)*<br>*(Maximum amps includes full load current plus battery recharge current)<br>*Minimum conductor size (number per Ø)* Ⓐ | With Filter:<br>Amps*<br>AWG or kcmil(ea) | 312<br>4/0(2) | 250<br>500(1) | 960<br>500(4) | 416<br>350(2) | 333<br>250(2) |
| | | Amps without Filter:<br>Amps*<br>AWG or kcmil(ea) | 360<br>300(2) | 294<br>4/0(2) | 1100<br>500(4) | 480<br>500(2) | 392<br>300(2) |
| AC INPUT | **AC Input to UPS Rectifier from Input Transformer** *3Ø, 1 Neutral, 1 gnd*<br>*Minimum conductor size (number per Ø)*<br>*(Maximum amps includes full load current plus battery recharge current)<br>*Minimum conductor size (number per Ø)* Ⓔ | Amps with Filter:<br>Amps*<br>AWG or kcmil(ea) | N/A<br>N/A | N/A<br>N/A | 416<br>350(2) | N/A<br>N/A | N/A<br>N/A |
| | | Amps without Filter:<br>Amps*<br>AWG or kcmil(ea) | 360<br>300(2) | 294<br>4/0(2) | 1100<br>500(4) | 480<br>500(2) | 392<br>300(2) |
| AC INPUT | **AC Input to UPS Bypass or Bypass Transformer**<br>*Full Load Current 3Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓑ | Amps<br>AWG or kcmil(ea) | 271<br>3/0(2) | 217<br>350(1) | 830<br>500(3) | 360<br>250(2) | 289<br>4/0(2) |
| AC INPUT | **AC Input to UPS Bypass from Bypass Transformer**<br>*Full Load Current 3Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓕ | Amps<br>AWG or kcmil(ea) | N/A<br>N/A | N/A<br>N/A | 830<br>500(3) | N/A<br>N/A | N/A<br>N/A |
| DC INPUT | **DC Input from Battery to UPS**<br>*(1) positive, (1) negative*<br>*Minimum conductor size (number per Ø)* Ⓒ | VDC<br>Amps @ (1.8V/cell)<br>AWG or kcmil(ea) | 480<br>450<br>400(2) | 480<br>450<br>400(2) | 480<br>600<br>300(3) | 480<br>600<br>300(3) | 480<br>600<br>300(3) |
| AC OUT-PUT | **AC Output to Output Transformer or Critical Load**<br>*Full Load Current 3Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓖ | Amps<br>AWG or kcmil(ea) | 271<br>3/0(2) | 217<br>350(1) | 360<br>250(2) | 360<br>250(2) | 289<br>4/0(2) |
| AC OUT-PUT | **AC Output from Output Transformer to Critical Load**<br>*Full Load Current 3Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓓ | Amps<br>AWG or kcmil(ea) | N/A<br>N/A | N/A<br>N/A | 830<br>500(3) | N/A<br>N/A | N/A<br>N/A |

*NOTE:* Callout letters Ⓐ, Ⓑ, Ⓒ, Ⓓ, Ⓔ, Ⓕ, and Ⓖ map to drawing #164201037–3

| | | |
|---|---|---|
| *DESCRIPTION:* **INSTALLATION NOTES** | | |
| *DRAWING NO:* 164201037–1 | *SHEET:* 3 of 17 | |
| *REVISION:* E | *DATE:* 113004 | |

**Table D. INPUT/OUTPUT Ratings & External Wiring Requirements for Powerware 9315 200 and 250 (0.9 pF)**

| *Ratings* | | *Units* | *Rating 50/60 Hz* | | |
|---|---|---|---|---|---|
| **Basic unit rating at 0.9 lagging PF load** | | Model | 200 | 250 | |
| | | KVA<br>KW | 200<br>180 | 200<br>180 | 250<br>225 |
| | | INPUT/OUTPUT VOLTAGE | 400 | 400 | 400 |
| AC INPUT | **AC Input to UPS Rectifier or Input Transformer**<br>**(.95min.PF)**<br>*3 Ø, 1 gnd*<br>*Minimum conductor size (number per Ø)*<br>*(Maximum amps includes full load current plus battery recharge current)<br>*Minimum conductor size (number per Ø)* Ⓐ | With Filter: | | | |
| | | Amps* | 348 | 348 | 435 |
| | | AWG or kcmil(ea) | 250(2) | 250(2) | 350(2) |
| | | Without Filter: | | | |
| | | Amps* | 397 | 397 | 515 |
| | | AWG or kcmil(ea) | 250(2) | 300(2) | 250(3) |
| AC INPUT | **AC Input to Bypass**<br>*Full Load Current 3 Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓑ | Amps | 290 | 290 | 360 |
| | | AWG or kcmil(ea) | 4/0(2) | 4/0(2) | 250(2) |
| DC INPUT | **DC Input from Battery to UPS**<br>*(1) positive, (1) negative*<br>*Minimum conductor size (number per Ø)* Ⓒ | VDC<br>Amps @ (1.8V/cell) | 420<br>514 | 420<br>514 | 420<br>642 |
| | | AWG or kcmil(ea) | 500(2) | 500(2) | 350(3) |
| AC OUTPUT | **AC Output to Critical Load**<br>*Full Load Current 3 Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓓ | Amps | 290 | 290 | 360 |
| | | AWG or kcmil(ea) | 4/0(2) | 4/0(2) | 250(2) |

*NOTE:* Callout letters Ⓐ, Ⓑ, Ⓒ, and Ⓓ map to drawing #164201037–3

400V = 380/400/415 Volt

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **INSTALLATION NOTES** | | |
| *DRAWING NO:* | 164201037–1 | *SHEET:* | 4 of 17 |
| *REVISION:* | F | *DATE:* | 051506 |

**Table E. INPUT/OUTPUT Ratings & External Wiring Requirements for Powerware 9315 225 (0.9 pF)**

| *Ratings* | | *Units* | *Rating 60 Hz* | |
|---|---|---|---|---|
| **Basic unit rating at 0.9 lagging PF load** | | KVA<br>KW | 225<br>202.5 | |
| | | INPUT/OUTPUT VOLTAGE | 208 | 480 |
| AC INPUT | **AC Input to UPS Rectifier or Input Transformer (.95min.PF)**<br>*3 Ø, 1 gnd*<br>*Minimum conductor size (number per Ø)*<br>*(Maximum amps includes full load current plus battery recharge current)<br>*Minimum conductor size (number per Ø)* Ⓐ | With Filter: | | |
| | | Amps* | 790 | 334 |
| | | AWG or kcmil(ea) | 500(3) | 4/0(2) |
| | | Without Filter: | | |
| | | Amps* | 880 | 396 |
| | | AWG or kcmil(ea) | 600(3) | 250(2) |
| AC INPUT | **AC Input to UPS Rectifier from Input Transformer (.95min.PF)**<br>*3 Ø, 1 gnd*<br>*Minimum conductor size (number per Ø)*<br>*(Maximum amps includes full load current plus battery recharge current)<br>*Minimum conductor size (number per Ø)* Ⓔ | With Filter: | | |
| | | Amps* | 334 | N/A |
| | | AWG or kcmil(ea) | 4/0(2) | N/A |
| | | Without Filter: | | |
| | | Amps* | 396 | N/A |
| | | AWG or kcmil(ea) | 250(2) | N/A |
| AC INPUT | **AC Input to Bypass**<br>*Full Load Current 3 Ø, (1) Neutral, (1) gnd Minimum conductor size (number per Ø)* Ⓑ | Amps | 625 | 271 |
| | | AWG or kcmil(ea) | 350(3) | 3/0(2) |
| DC INPUT | **DC Input from Battery to UPS**<br>*(1) positive, (1) negative*<br>*Minimum conductor size (number per Ø)* Ⓒ | VDC<br>Amps @ (1.8V/cell) | 480<br>505 | 480<br>505 |
| | | AWG or kcmil(ea) | 4/0(3) | 4/0(3) |
| AC OUTPUT | **AC Output to Critical Load**<br>*Full Load Current 3 Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓓ | Amps | 625 | 271 |
| | | AWG or kcmil(ea) | 350(3) | 3/0(2) |

*NOTE:* Callout letters Ⓐ, Ⓑ, Ⓒ, Ⓓ, and Ⓔ map to drawing #164201037–3

| | | |
|---|---|---|
| *DESCRIPTION:* **INSTALLATION NOTES** | | |
| *DRAWING NO:* 164201037–1 | | *SHEET:* 5 of 17 |
| *REVISION:* F | *DATE:* 051506 | |

| Table F. INPUT/OUTPUT Ratings & External Wiring Requirements for Powerware 9315 300 (0.9 pF) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***Ratings*** | | ***Units*** | ***Rating 60 Hz*** | | | | |
| **Basic unit rating at 0.9 lagging PF load** | | KVA<br>KW | 225<br>202.5 | | 300<br>270 | | |
| | | INPUT/OUTPUT VOLTAGE | 480 | 600 | 208 | 480 | 600 |
| AC INPUT | **AC Input to UPS Rectifier or Input Transformer (0.95min.PF)**<br>*3Ø, 1 Neutral, 1 gnd*<br>*Minimum conductor size (number per Ø)*<br>*(Maximum amps includes full load current plus battery recharge current)<br>*Minimum conductor size (number per Ø)* Ⓐ | With Filter:<br>Amps*<br>AWG or kcmil(ea) | <br>334<br>4/0(2) | <br>274<br>500(1) | <br>1056<br>500(4) | <br>450<br>350(2) | <br>366<br>250(2) |
| | | Amps without Filter:<br>Amps*<br>AWG or kcmil(ea) | <br>396<br>300(2) | <br>323<br>4/0(2) | <br>1221<br>600(4) | <br>529<br>500(2) | <br>432<br>350(2) |
| AC INPUT | **AC Input to UPS Rectifier from Input Transformer** *3Ø, 1 Neutral, 1 gnd*<br>*Minimum conductor size (number per Ø)*<br>*(Maximum amps includes full load current plus battery recharge current)<br>*Minimum conductor size (number per Ø)* Ⓔ | Amps with Filter:<br>Amps*<br>AWG or kcmil(ea) | <br>N/A<br>N/A | <br>N/A<br>N/A | <br>N/A<br>N/A | <br>N/A<br>N/A | <br>N/A<br>N/A |
| | | Amps without Filter:<br>Amps*<br>AWG or kcmil(ea) | <br>396<br>300(2) | <br>323<br>4/0(2) | <br>1221<br>600(4) | <br>529<br>500(2) | <br>432<br>350(2) |
| AC INPUT | **AC Input to UPS Bypass or Bypass Transformer**<br>*Full Load Current 3Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓑ | Amps<br>AWG or kcmil(ea) | 271<br>3/0(2) | 217<br>350(1) | 830<br>500(3) | 360<br>250(2) | 289<br>4/0(2) |
| AC INPUT | **AC Input to UPS Bypass from Bypass Transformer**<br>*Full Load Current 3Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓕ | Amps<br>AWG or kcmil(ea) | N/A<br>N/A | N/A<br>N/A | 830<br>500(3) | N/A<br>N/A | N/A<br>N/A |
| DC INPUT | **DC Input from Battery to UPS**<br>*(1) positive, (1) negative*<br>*Minimum conductor size (number per Ø)* Ⓒ | VDC<br>Amps @ (1.8V/cell)<br>AWG or kcmil(ea) | 480<br>505<br>4/0(3) | 480<br>505<br>4/0(3) | 480<br>675<br>350(3) | 480<br>675<br>350(3) | 480<br>675<br>350(3) |
| AC OUT-PUT | **AC Output to Output Transformer or Critical Load**<br>*Full Load Current 3Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓖ | Amps<br>AWG or kcmil(ea) | 271<br>3/0(2) | 217<br>350(1) | 360<br>250(2) | 360<br>250(2) | 289<br>4/0(2) |
| AC OUT-PUT | **AC Output from Output Transformer to Critical Load**<br>*Full Load Current 3Ø, (1) Neutral, (1) gnd*<br>*Minimum conductor size (number per Ø)* Ⓓ | Amps<br>AWG or kcmil(ea) | N/A<br>N/A | N/A<br>N/A | 830<br>500(3) | N/A<br>N/A | N/A<br>N/A |

*NOTE:* Callout letters Ⓐ, Ⓑ, Ⓒ, Ⓓ, Ⓔ, Ⓕ, and Ⓖ map to drawing #164201037–3

| | | |
|---|---|---|
| *DESCRIPTION:* **INSTALLATION NOTES** | | |
| *DRAWING NO:* 164201037–1 | *SHEET:* 6 of 17 | |
| *REVISION:* F | *DATE:* 051506 | |

1. A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conducter.
2. External overcurrent protection is not provided by this product, but is required by codes. Refer to Table B through Table F for wiring requirements. If an output lockable disconnect is required, it is to be supplied by designated personnel.
3. When an input transformer is present, the rectifier and bypass inputs may both be supplied by the same source.
4. Non-linear loads can create neutral currents that are greater than 100%. This product can accommodate double-sized neutral terminations if needed.
5. Terminals E1 through E12 and E22 through E29 are UL and CSA rated at 90˚C. A hex key tool is required to attach wires to terminals. Refer to Table G and Table H for power cable terminations and conduit requirements. Drawing 164201037−4 shows the location of the power cable terminals inside the UPS cabinet. Refer to Chapter 5 in this manual for location of the power cable terminals inside the transformer cabinets.

**Table G. UPS Cabinet Power Cable Terminations and Conduit Requirements**

| *Terminal Function* | *Terminal* | *Function* | *Size of Pressure Termination* | *Tightening Torque N-M (lb-in)* | *Int Hex Size (In.)* | *Number Wires in Conduit* | *Min. Conduit Trade Size* |
|---|---|---|---|---|---|---|---|
| **Internal Wiring to UPS Rectifier** (CB1 Input - Powerware 9315-225) | E1 | Phase A | 2 – #3/0−250 kcmil | 31.1 (275) | 3/8 | 3 | 4 in. |
| | E2 | Phase B | 2 – #3/0−250 kcmil | 31.1 (275) | 3/8 | 3 | |
| | E3 | Phase C | 2 – #3/0−250 kcmil | 31.1 (275) | 3/8 | 3 | |
| **Internal Wiring to UPS Rectifier** (CB1 Input - Powerware 9315-300) | E1 | Phase A | 2 – 250−500 kcmil | 31.1 (275) | 3/8 | 3 | 4 in. |
| | E2 | Phase B | 2 – 250−500 kcmil | 31.1 (275) | 3/8 | 3 | |
| | E3 | Phase C | 2 – 250−500 kcmil | 31.1 (275) | 3/8 | 3 | |
| **AC Input to Bypass** | E6 | Phase A | 4 – #2−600 kcmil | 56.5 (500) | 1/2 | 3 | 2 in. |
| | E7 | Phase B | 4 – #2−600 kcmil | 56.5 (500) | 1/2 | 3 | 2 in. |
| | E8 | Phase C | 4 – #2−600 kcmil | 56.5 (500) | 1/2 | 3 | 2 in. |
| **AC Output to Output Transformer or Critical Load** | E9 | Phase A | 4 – #2−600 kcmil | 56.5 (500) | 1/2 | 3 | 2 in. |
| | E10 | Phase B | 4 – #2−600 kcmil | 56.5 (500) | 1/2 | 3 | 2 in. |
| | E11 | Phase C | 4 – #2−600 kcmil | 56.5 (500) | 1/2 | 3 | 2 in. |
| **DC Input from Battery to UPS** | E4 | Battery (+) | 4 – #2−600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E5 | Battery (−) | 4 – #2−600 kcmil | 56.5 (500) | 1/2 | 3 | |
| **Neutral, Output** | E12 | Neutral | 12 – #2−600 kcmil | 56.5 (500) | 1/2 | 3 | 2 in. |
| **Customer Ground** | Ground | Ground | 8 – #2−600 kcmil | 56.5 (500) | 1/2 | 1 | 2 in. |

NOTE: Customer ground, size 2/0, can be run in any conduit listed in Table G and Table H.

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **INSTALLATION NOTES** | | |
| *DRAWING NO:* | 164201037−1 | *SHEET:* | 7 of 17 |
| *REVISION:* C | | *DATE:* | 121598 |

**Table H. Transformer Cabinet Power Cable Terminations and Conduit Requirements**

| *Terminal Function* | *Terminal* | *Function* | *Size of Pressure Termination* | *Tightening Torque N-M (lb-in)* | *Int Hex Size (In.)* | *Number Wires in Conduit* | *Min. Conduit Trade Size* |
|---|---|---|---|---|---|---|---|
| **AC Input to Input Isolation Transformer 480/480** (as applicable) | E23 | Phase A | 3 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E24 | Phase B | 3 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E25 | Phase C | 3 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| **AC Output from Input Isolation Transformer 480/480** (as applicable) | E26 | Phase A | 3 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E27 | Phase B | 3 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E28 | Phase C | 3 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| **AC Input to Input Isolation Transformer 600/480** (as applicable) | E23 | Phase A | 3 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E24 | Phase B | 3 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E25 | Phase C | 3 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| **AC Output from Input Isolation Transformer 600/480** (as applicable) | E26 | Phase A | 3 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E27 | Phase B | 3 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E28 | Phase C | 3 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| **AC Input to Input Isolation Transformer 208/480** (as applicable) | E23 | Phase A | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E24 | Phase B | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E25 | Phase C | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E22 | Neutral | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| **AC Output from Input Isolation Transformer 208/480** (as applicable) | E26 | Phase A | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E27 | Phase B | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E28 | Phase C | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E29 | Neutral | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| **AC Input to Output Auto Transformer (480/208)** (as applicable) | E23 | Phase A | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E24 | Phase B | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E25 | Phase C | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E22 | Neutral | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| **AC Output from Output Auto Transformer (480/208)** (as applicable) | E26 | Phase A | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E27 | Phase B | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E28 | Phase C | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |
| | E29 | Neutral | 4 – #2–600 kcmil | 56.5 (500) | 1/2 | 3 | 3 in. |

NOTE: Customer ground, size 2/0, can be run in any conduit listed in Table G.

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **INSTALLATION NOTES** | | |
| *DRAWING NO:* | 164201037–1 | *SHEET:* | 8 of 17 |
| *REVISION:* E | | *DATE:* | 113004 |

1. In the UPS system, each battery cabinet, PDM cabinet, and the input transformer cabinet are crated separately for shipping.
2. Do not tilt cabinets more than ±10˚ during handling.
3. Dimensions are in millimeters (inches).
4. If perforated floor tiles are required for ventilation, you should place them in front of the UPS. Table I lists the ventilation requirements for full load operation:

**Table I. Air Conditioning or Ventilation Requirements During Full Load Operation**

| *Ratings* | *Input/Output Voltage* | Heat Rejection* BTU/hr × 1000/hr (Kg−cal/hr) | |
|---|---|---|---|
| | | 0.8 pF | 0.9 pF |
| **Powerware 9315 200** | | | |
| 200 kVA | 400/400 | 47.8 (12.5) | 55.9 (14.1) |
| **Powerware 9315 225** | | | |
| 225 kVA | 480/208, 480/480 | 53.7 (13.5) | 62.8 (15.8) |
| **Powerware 9315 250** | | | |
| 200 kVA | 400/400 | 47.8 (12.5) | 55.9 (14.1) |
| 250 kVA | 400/400 | 59.7 (15.0) | 69.9 (17.6) |
| **Powerware 9315 300** | | | |
| 225 kVA | 480/480 | 53.7 (13.5) | 62.8 (15.8) |
| 225 kVA | 600/600 | 61.7 (15.5) | 72.2 (18.2) |
| 300 kVA | 208/208 | 82.4 (20.8) | 96.5(24.3) |
| 300 kVA | 480/480 | 71.7 (18.1) | 83.9 (21.1) |
| 300 kVA | 600/600 | 82.4 (20.8) | 96.5 (24.3) |

***** Worst case scenario heat rejection data to ensure cooling capacity (includes losses from filters and transformers).

5. Recommended minimum clearance over the UPS module is 304.8 mm (12 in.). Required for cooling air exhaust: approximately 1420 liter/sec (3000 cfm).
6. Battery voltage is computed at 2V per cell as defined by Article 480 of the NEC. Rated battery current is computed at 1.8V per cell.
7. The battery wiring used between the battery and the UPS should not allow a voltage drop of more than 1% of nominal DC voltage at rated battery current.
8. A battery disconnect switch is recommended, and may be required by NEC or local codes when batteries are remotely located. The battery disconnect switch may be supplied as an accessory, and should be installed between the battery and the UPS.
9. If the conductors used for DC input from the battery cabinet(s) to the UPS are those provided by the UPS manufacturer, and the UPS and battery cabinet are manufactured by the same supplier, then it is acceptable if they do not meet the noted minimum conductor sizes.

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **INSTALLATION NOTES** | | |
| *DRAWING NO:* | 164201037−1 | *SHEET:* | 9 of 17 |
| *REVISION:* E | | *DATE:* | 113004 |

1. Table J lists the maximum rating for input circuit breakers.

| **Table J. Maximum Input Circuit Breaker Ratings** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Powerware System | Input Voltage Rating | | | | | | | |
| | 208V | | 400V | | 480V | | 600V | |
| | 0.8pF | 0.9pF | 0.8pF | 0.9pF | 0.8pF | 0.9pF | 0.8pF | 0.9pF |
| Powerware 9315 200 | N/A | N/A | 450 | 500 | N/A | N/A | N/A | N/A |
| Powerware 9315 225 | 1000 | 1200 | N/A | N/A | 450 | 500 | N/A | N/A |
| Powerware 9315 250 | N/A | N/A | 600 | 700 | N/A | N/A | N/A | N/A |
| Powerware 9315 300 | 1600 | 1600 | N/A | N/A | 600 | 700 | 500 | 600 |

CAUTION: To reduce the risk of fire, connect only to a circuit provided with maximum input circuit breaker current ratings from Table J in accordance with the National Electrical code, ANSI/NFPA 70.

2. Source protection for the optional input transformer should be treated as if you were supplying a three-phase transformer, to allow for transformer magnetization inrush current.
3. Source protection for the AC input should be treated as if you were supplying a three-phase transformer, to allow for filter inrush current.
4. Source protection for the input to the bypass section should be treated as if you were supplying a 500 kVA three-phase transformer, to allow for transformer magnetization inrush current.
5. The input breaker (CB1) has a trip rating of 400A AT and an Amp Interrupting Capability (AIC) of 25,000 in symmetrical RMS amps for the Powerware 9315 225 and a trip rating of 600AAT and an Amp Interrupting Capability (AIC) of 50,000 in symmetrical RMS amps for the Powerware 9315 300. See Table K:

| **Table K. Equivalent Transformer Size for Determining Inrush** | |
|---|---|
| Optional Input Transformer | 500 kVA |

6. The input and bypass three-phase feeds should be symmetrical about ground, due to the existence of voltage surge protection devices.
7. The line-to-line unbalanced output capability of the UPS is limited only by the full load per phase current values for AC output to critical load shown in Table B through Table F. The recommended line-to-line load unbalance is 50% or less.

| | | |
|---|---|---|
| *DESCRIPTION:* | **INSTALLATION NOTES** | |
| *DRAWING NO:* | 164201037–1 | *SHEET:* 10 of 17 |
| *REVISION:* E | *DATE:* 113004 | |

**8.** Output overcurrent protection and output disconnect switch are to be provided by the user. Table L lists the maximum rating for output circuit breakers satisfying the criteria for both.

**Table L. Maximum Output Circuit Breaker Ratings**

| Powerware System | Output Voltage Rating | | | |
|---|---|---|---|---|
| | 208V | 400V | 480V | 600V |
| Powerware 9315 200 | N/A | 400 | N/A | N/A |
| Powerware 9315 225 | 800 | N/A | 350 | N/A |
| Powerware 9315 250 | N/A | 450 | N/A | N/A |
| Powerware 9315 300 | 1000 | N/A | 450 | 400 |

**9.** Table M lists the maximum rating for remote battery disconnect circuit breakers.

**Table M. Maximum Remote Battery Disconnect Circuit Breaker Ratings**

| Powerware 9315 System | Circuit Breaker Rating | | DC Voltage |
|---|---|---|---|
| | 0.8 load pF | 0.9 load pF | |
| Model 200 | 600 | 700 | 420 |
| Model 225 | 600 | 700 | 480 |
| Model 250 | 800 | 800 | 420 |
| Model 300 | 800 | 1000 | 480 |

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **INSTALLATION NOTES** | | |
| *DRAWING NO:* | 164201037–1 | *SHEET:* | 11 of 17 |
| *REVISION:* E | | *DATE:* | 113004 |

1. Your UPS equipment's operating environment must meet the size and weight requirements shown in Table N, according to your UPS system configuration.
2. The basic environmental requirements for operation of the UPS system are:

**Ambient Temperature Range:** 0–40˚C (32–104˚F)

**Recommended Operating Range:** 20–25˚C (68–77˚F)

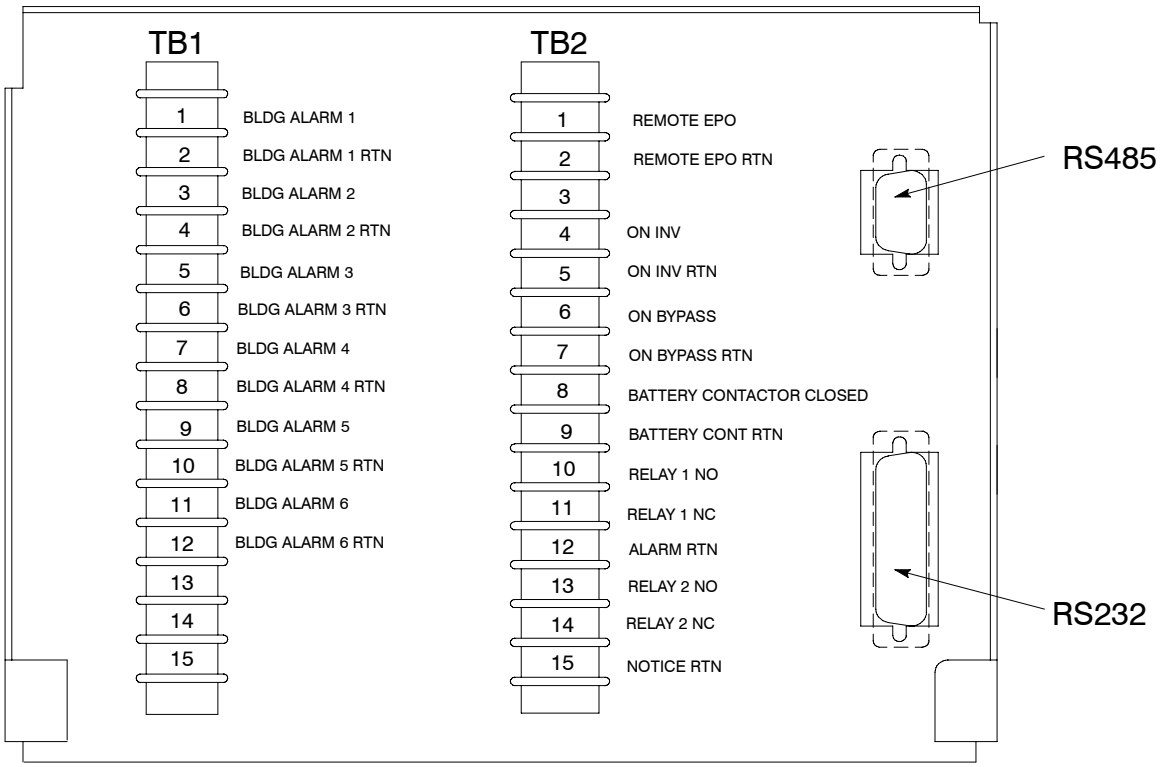
**Maximum Relative Humidity:** 95% noncondensing

**Table N. Equipment Weight and Point Loading**

| *Component* | *Weight Kg (lb)* | *Point Loading Kg (lb)* |
|---|---|---|
| UPS Cabinet (Powerware 9315 225) (480/208 & 480/480 Systems) | 1752 (3863) | N/A |
| | 1729 (3812) | N/A |
| UPS Cabinet (Powerware 9315 300) (600/600 & 480/480 Systems) | 1895 (4177) | N/A |
| UPS Cabinet (Powerware 9315 200) (400/400 Systems) | 1729 (3812) | N/A |
| UPS Cabinet (Powerware 9315 250) (400/400 Systems) | 1895 (4177) | N/A |
| Input Transformer Cabinet (480/480, 600/480) (maximum) | 1134 (2500) | 4 at 284 (625) |
| Input Transformer Cabinet (208/480) (maximum) | 1860(4100) | 4 at 465 (1025) |
| Output Transformer Cabinet (480/208) (maximum) | 1860(4100) | 4 at 465 (1025) |
| PDM Cabinet | 226 (500) | 4 at 57 (125) |
| Battery Cabinets: | | |
| Series 1085–J27 | 1429 (3150) | 8 at 179 (394) |
| Series 1085–J31 | 1588 (3500) | 8 at 199 (438) |
| Series 1085–J37 | 1708 (3765) | 8 at 214 (471) |
| Series 1085–J47 | 2178 (4800) | 8 at 272 (600) |

| | | |
|---|---|---|
| *DESCRIPTION:* **INSTALLATION NOTES** | | |
| *DRAWING NO:* 164201037–1 | | *SHEET:* 12 of 17 |
| *REVISION:* E | *DATE:* 113004 | |

## Communication Panel




***NOTE:*** *All building alarm inputs or remote features require an isolated normally open contact or switch (rated at 24 Vdc, 20 mA minimum) connected between the alarm input and common terminal as shown. All control wiring and relay and switch contacts are customer-provided.*

***NOTE:*** *Regardless of assignment, alarms display as Building Alarm 1, Building Alarm 2, etc., on the Monitor Panel. Use twisted-pair wires for each alarm input and common.*

| | | |
|---|---|---|
| *DESCRIPTION:* **INSTALLATION NOTES** | | |
| *DRAWING NO:* 164201037–1 | | *SHEET:* 13 of 17 |
| *REVISION:* E | *DATE:* 113004 | |

| **Table O. Communications Panel Inputs and Outputs** | | |
|---|---|---|
| TB1 Pin # | Name | Description |
| 1 | BLDG ALARM 1 | Programmable UPS alarm. Activated by a remote contact closure. |
| 2 | BLDG ALARM 1 RTN | |
| 3 | BLDG ALARM 2 | Programmable UPS alarm. Activated by a remote contact closure. |
| 4 | BLDG ALARM 2 RTN | |
| 5 | BLDG ALARM 3 | Programmable UPS alarm. Activated by a remote contact closure. |
| 6 | BLDG ALARM 3 RTN | |
| 7 | BLDG ALARM 4 | Programmable UPS alarm. Activated by a remote contact closure. |
| 8 | BLDG ALARM 4 RTN | |
| 9 | BLDG ALARM 5 | Programmable UPS alarm. Activated by a remote contact closure. |
| 10 | BLDG ALARM 5 RTN | |
| 11 | BLDG ALARM 6 | Programmable UPS alarm. Activated by a remote contact closure. |
| 12 | BLDG ALARM 6 RTN | |

| **Table P. Communications Panel Inputs and Outputs** | | |
|---|---|---|
| TB2 Pin # | Name | Description |
| 1 | REMOTE EPO | Contacts used to activate remote EPO of UPS. |
| 2 | REMOTE EPO RTN | |
| 3 | | |
| 4 | ON INV | Contacts used to indicate On Inverter status of UPS. |
| 5 | ON INV RTN | |
| 6 | ON BYPASS | Contacts used to indicate On Bypass status of UPS. |
| 7 | ON BYPASS RTN | |
| 8 | BATTERY CONTACTOR CLOSED | Contacts used to indicate UPS Battery Contactor is closed. |
| 9 | BATTERY CONT RTN | |
| 10 | RELAY 1 NO | General purpose NO and NC relay contacts. |
| 11 | RELAY 1 NC | |
| 12 | ALARM RTN | |
| 13 | RELAY 2 NO | General purpose NO and NC relay contacts. |
| 14 | RELAY 2 NC | |
| 15 | NOTICE RTN | |

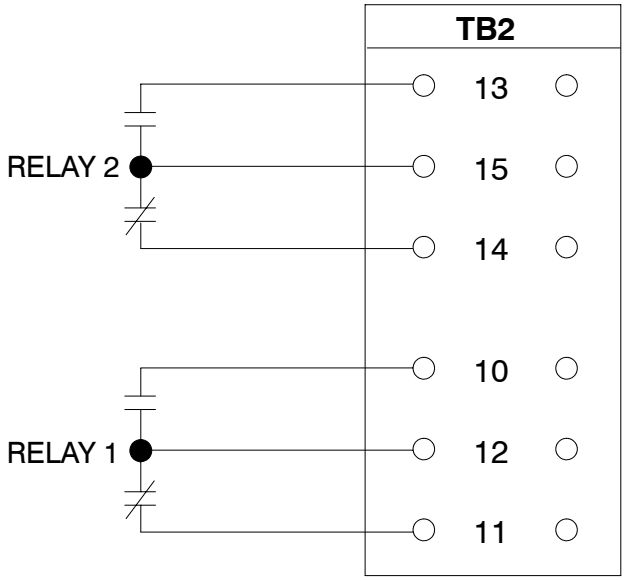
| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **INSTALLATION NOTES** | | |
| *DRAWING NO:* | 164201037–1 | *SHEET:* | 14 of 17 |
| *REVISION:* E | | *DATE:* | 113004 |

1. Use Class 1 wiring methods (as defined by the NEC) for control wiring. Install the control wiring in separate conduit from the power wiring. The wire should be rated at 24V, 1A minimum.
2. Refer to Table Q, Table R, Table S, and to applicable chapters for information about installing control wiring for options and accessories.

**Table Q. Control Wiring Terminations**

| *Terminal* | *Description* | *Terminal Function* |
|---|---|---|
| TB1 | Terminal Block | Building Alarms (optional, up to 6) |
| | | Generator Interface |
| TB1 | Terminal Block | Remote EPO |
| TB2 | | "On Inverter" Monitoring |
| TB2 | | "On Bypass" Monitoring |
| | | Summary Alarm & Notice Contacts |

**Table R. Summary Alarm Relay Contacts**

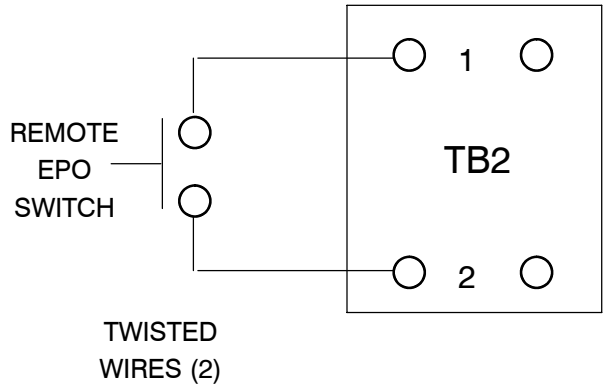



| *CONTACT RATING:* | | |
|---|---|---|
| Maximum Switched Voltage | 32 VAC | 42 VDC |
| Maximum Carrying Current | 1A | |

| | | |
|---|---|---|
| *DESCRIPTION:* **INSTALLATION NOTES** | | |
| *DRAWING NO:* 164201037–1 | | *SHEET:* 15 of 17 |
| *REVISION:* E | *DATE:* 113004 | |

**3.** The Remote EPO feature opens all breakers and contactors in the UPS cabinet and isolates power from your critical load. Local electrical codes may also require tripping upstream protective devices to the UPS.

**Table S. Remote EPO**




Remote EPO switch rating is 24 Vdc.
1A minimum if supplied by user.

***NOTE:*** *This switch must be a dedicated switch, and not tied into any other circuits.*

| | | |
|---|---|---|
| *DESCRIPTION:* | **INSTALLATION NOTES** | |
| *DRAWING NO:* | 164201037–1 | *SHEET:* 16 of 17 |
| *REVISION:* E | *DATE:* 113004 | |

**1.** Table T lists the battery shunt trip or UV trip wiring requirements.

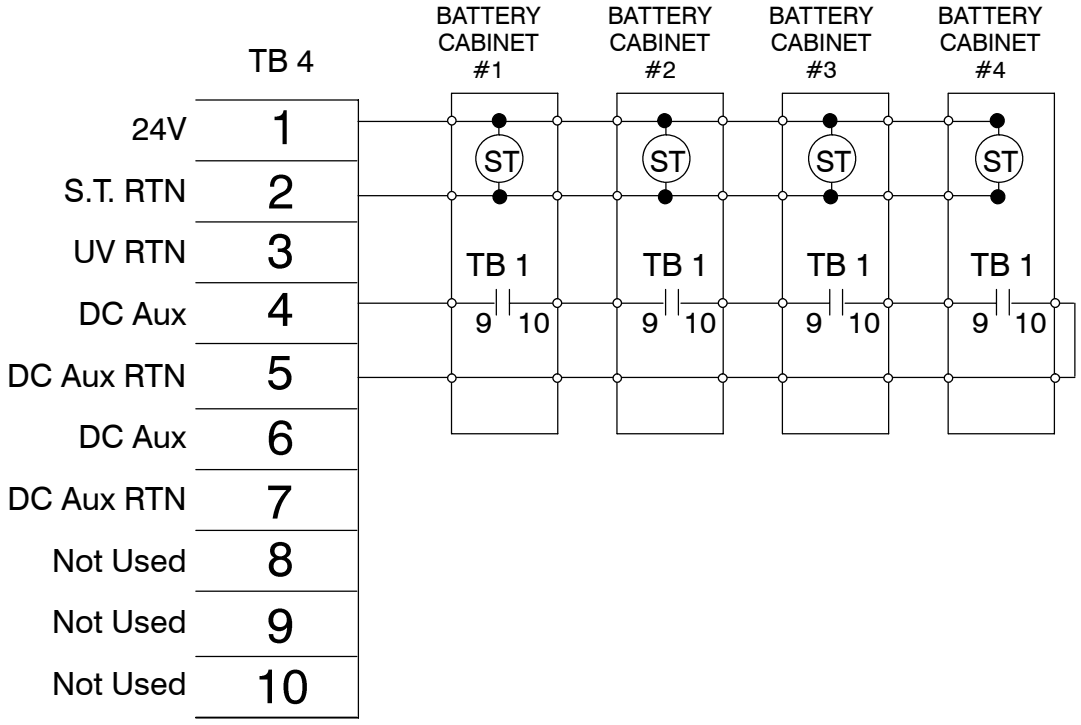
| **Table T. Battery Shunt Trip or UV Trip Wiring Requirements** | | |
|---|---|---|
| | ST | UV |
| TB4 Points | 1, 2 | 1, 3 |
| Output Max Pulse | 220 VA instantaneous | 40 VA |
| Wiring | #12–22 AWG | #12–22 AWG |

**2.** There is no DC disconnect device within the UPS.

**3.** The DC input to the UPS is protected by internal fuses F21 and F22.

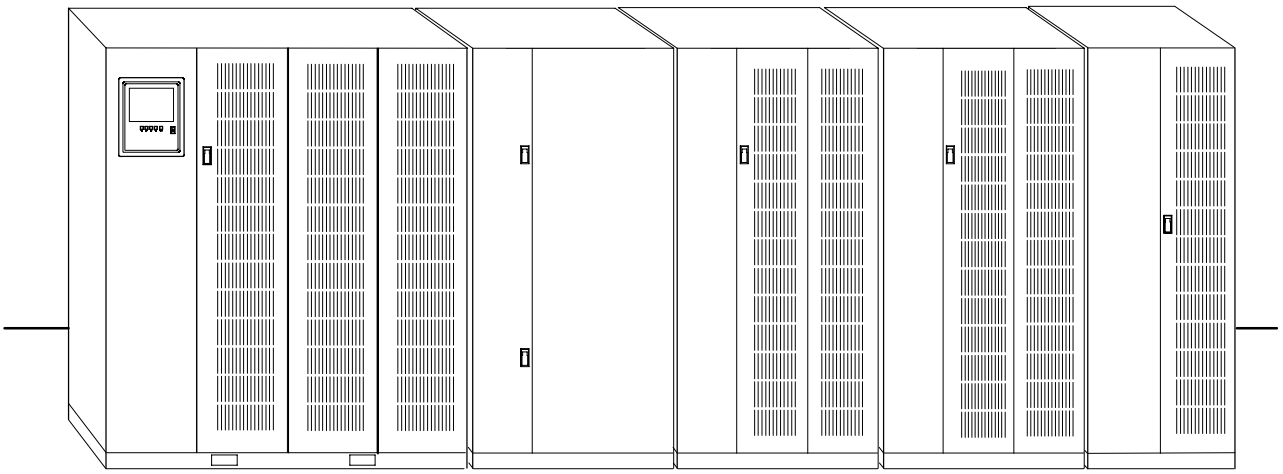
**4.** The UPS DC disconnect trip signal from TB4, points 1 and 2 (shunt trip) or TB4, points 1 and 3 (UV trip) must be connected to the DC source disconnect device(s).

**5.** Recommended wire size is 14 AWG.




***NOTE:*** *For other than Powerware battery cabinets that use UV trip coils, connect to TB4 Pin 3 instead of TB4 Pin 2.*

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **INSTALLATION NOTES** | | |
| *DRAWING NO:* | 164201037–1 | *SHEET:* | 17 of 17 |
| *REVISION:* | E | *DATE:* | 113004 |



*UPS CABINET*

*BATTERY CABINET (optional)*

*INPUT CABINET*

*OUTPUT TRANSFORMER (optional)*

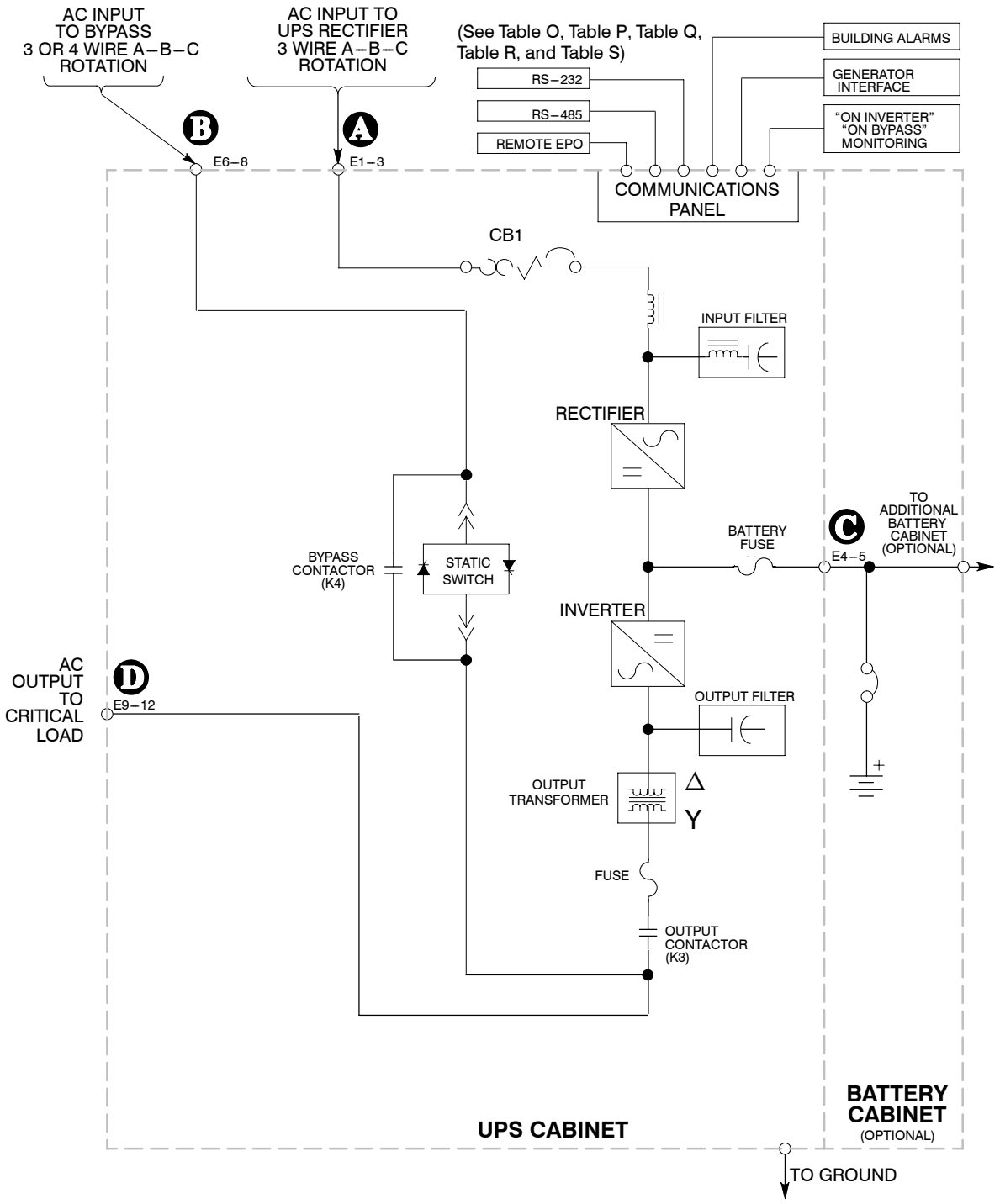
*PDM CABINET (optional– requires 480/208 transformer)*

***NOTE:*** *The input transformer cabinet may be installed on either the left or the right side of the UPS cabinet.*

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **TYPICAL UPS SYSTEM** | | |
| *DRAWING NO:* | 164201037–2 | *SHEET:* | 1 of 1 |
| *REVISION:* | A | *DATE:* | 020497 |

| **Table U. UPS System Oneline Configurations** | | | | |
|---|---|---|---|---|
| Oneline Drawing 164201037–7 | Powerware 9315 | Vin / Vout | Input Transformer | Output Transformer |
| Sheet 1 | 225 | 480/208 | N/A | N/A |
| Sheet 1 | 225, 300 | 480/480 | N/A | N/A |
| Sheet 1 | 200, 250 | 400/400 | N/A | N/A |
| Sheet 2 | 225, 300 | 480/480 | Isolation (Delta in, Delta out) | N/A |
| Sheet 2 | 225, 300 | 600/600 | Isolation (Delta in, Delta out) | N/A |
| Sheet 2 | 225 | 208/208 | Isolation (Delta in, Delta out) | N/A |
| Sheet 3 | 300 (Single Feed) | 208/208 | Isolation (Wye in, Wye out) | Auto |
| Sheet 4 | 300 (Dual Feed) | 208/208 | Isolation (Wye in, Wye out) | Auto |

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **UPS SYSTEM ONELINE CONFIGURATIONS** | | |
| *DRAWING NO:* | 164201037–3 | *SHEET:* | 1 of 1 |
| *REVISION:* | D | *DATE:* | 041500 |

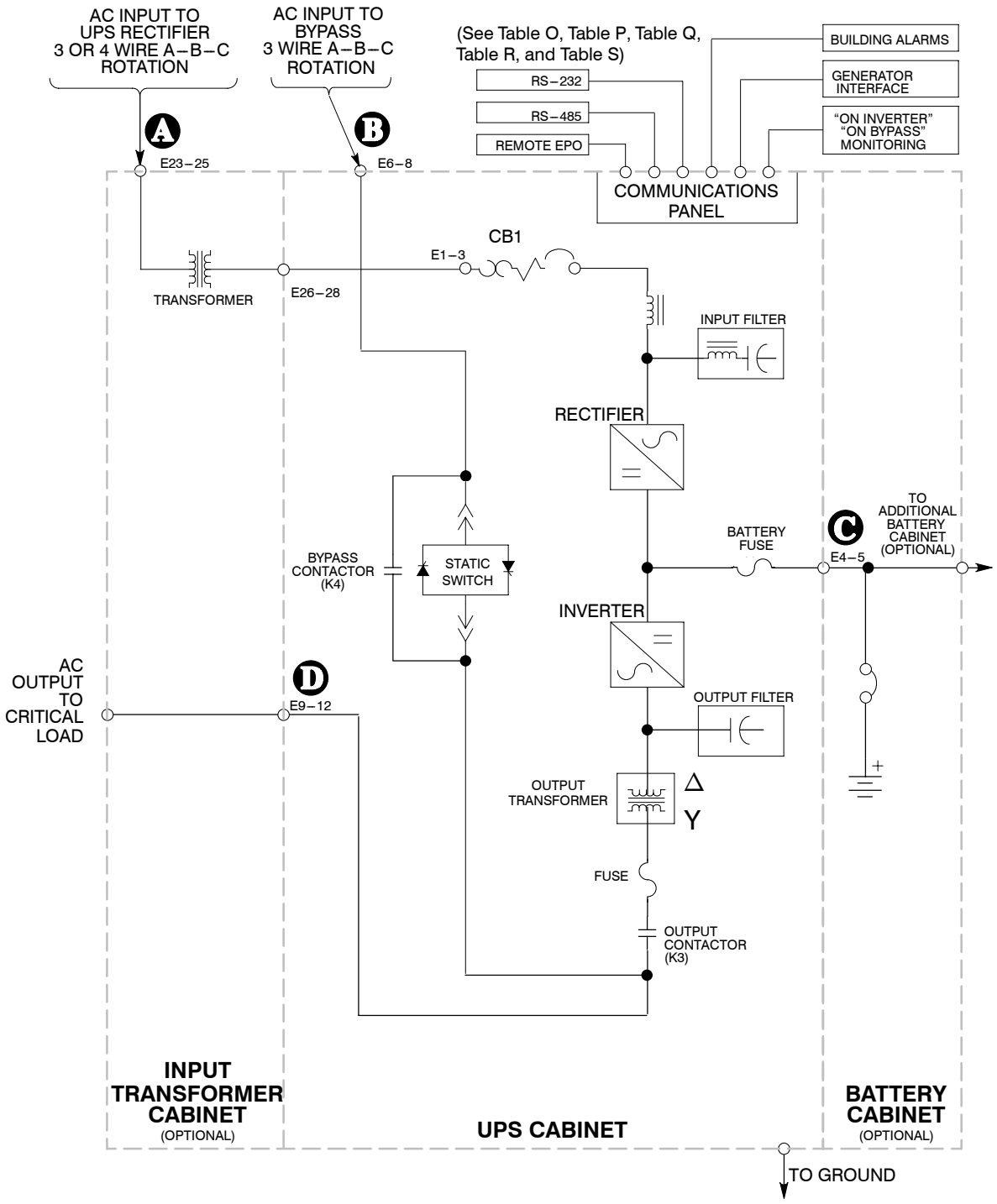



## UPS SYSTEM WITHOUT OPTIONAL INPUT TRANSFORMER

*NOTE 1: A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conductor.*

*NOTE 2: See Table U to determine when an input transformer is required.*

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **ONELINE DRAWINGS OF UPS SYSTEM** | | |
| *DRAWING NO:* | 164201037–4 | *SHEET:* | 1 of 4 |
| *REVISION:* | E | *DATE:* | 1113004 |

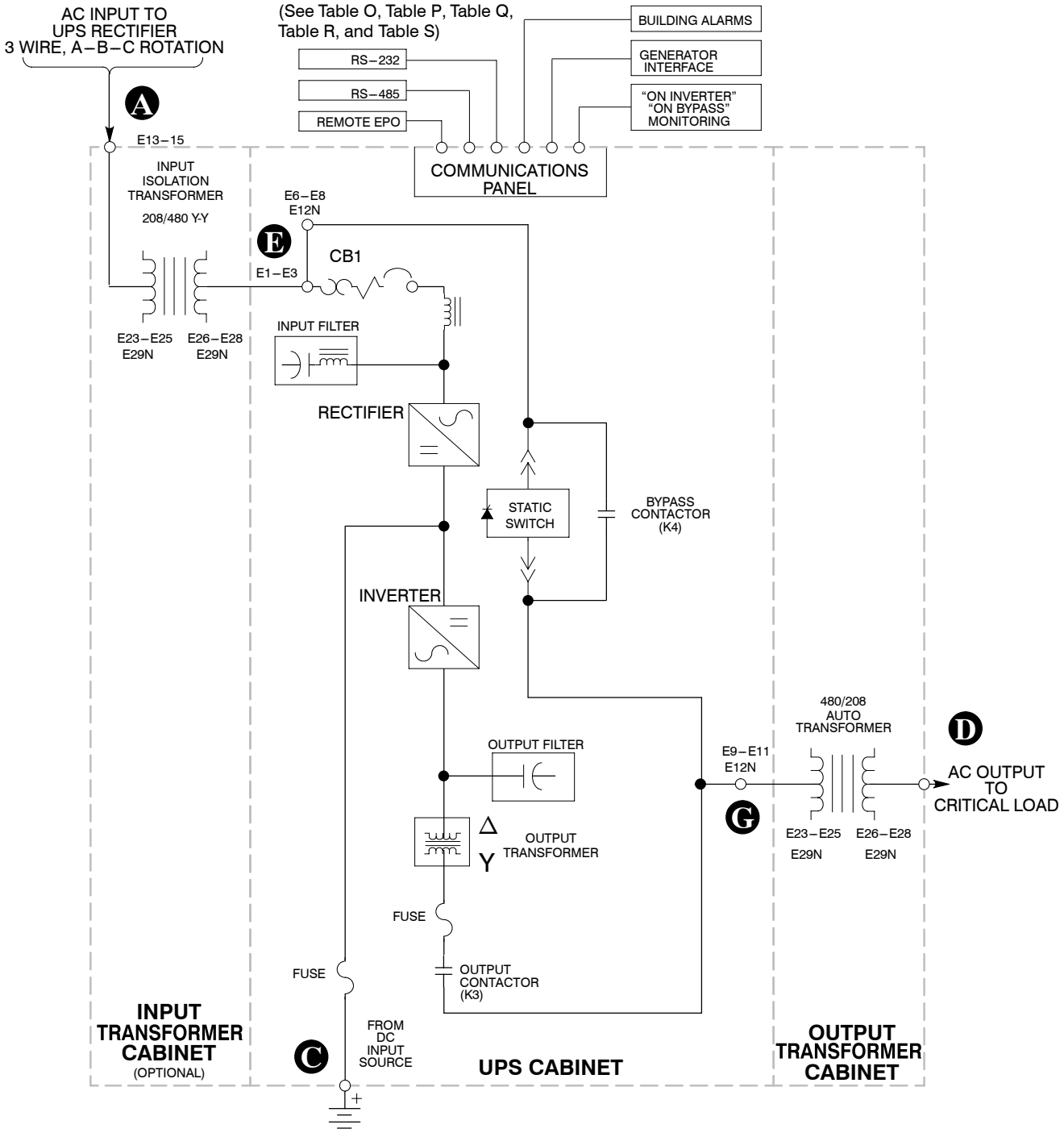



## UPS SYSTEM WITH OPTIONAL INPUT TRANSFORMER

*NOTE 1: A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conductor.*

*NOTE 2: See Table U to determine when an input transformer is required.*

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **ONELINE DRAWINGS OF UPS SYSTEM** | | |
| *DRAWING NO:* | 164201037–4 | *SHEET:* | 2 of 4 |
| *REVISION:* | E | *DATE:* | 113004 |

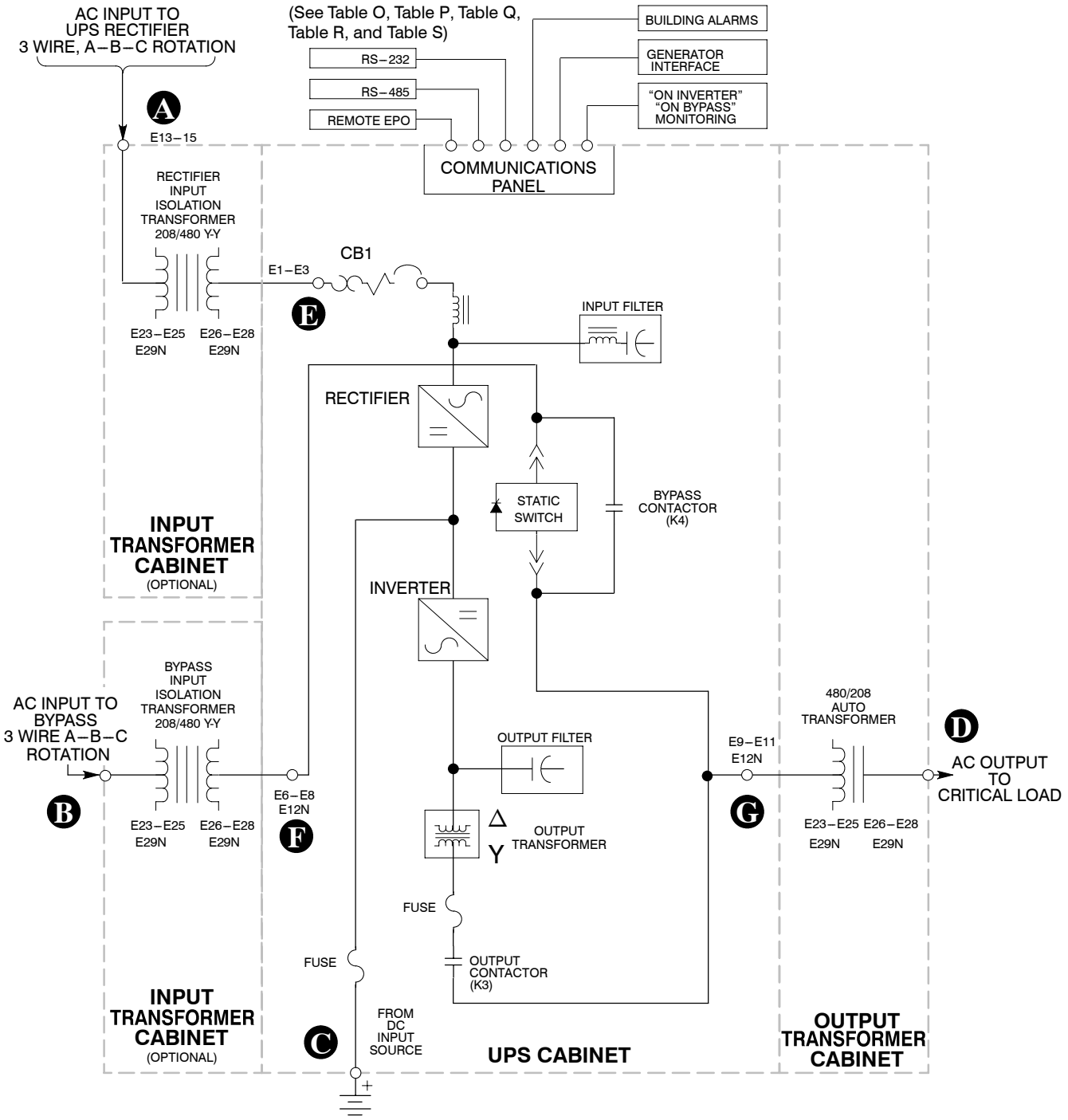



## UPS SYSTEM WITH OPTIONAL INPUT ISOLATION TRANSFORMER AND OUTPUT AUTO TRANSFORMER (208V INPUT SINGLE FEED)

*NOTE 1: A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conductor.*

*NOTE 2: See Table U to determine when an input transformer is required.*

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **ONELINE DRAWINGS OF UPS SYSTEM** | | |
| *DRAWING NO:* | 164201037–4 | *SHEET:* | 3 of 4 |
| *REVISION:* | E | *DATE:* | 113004 |

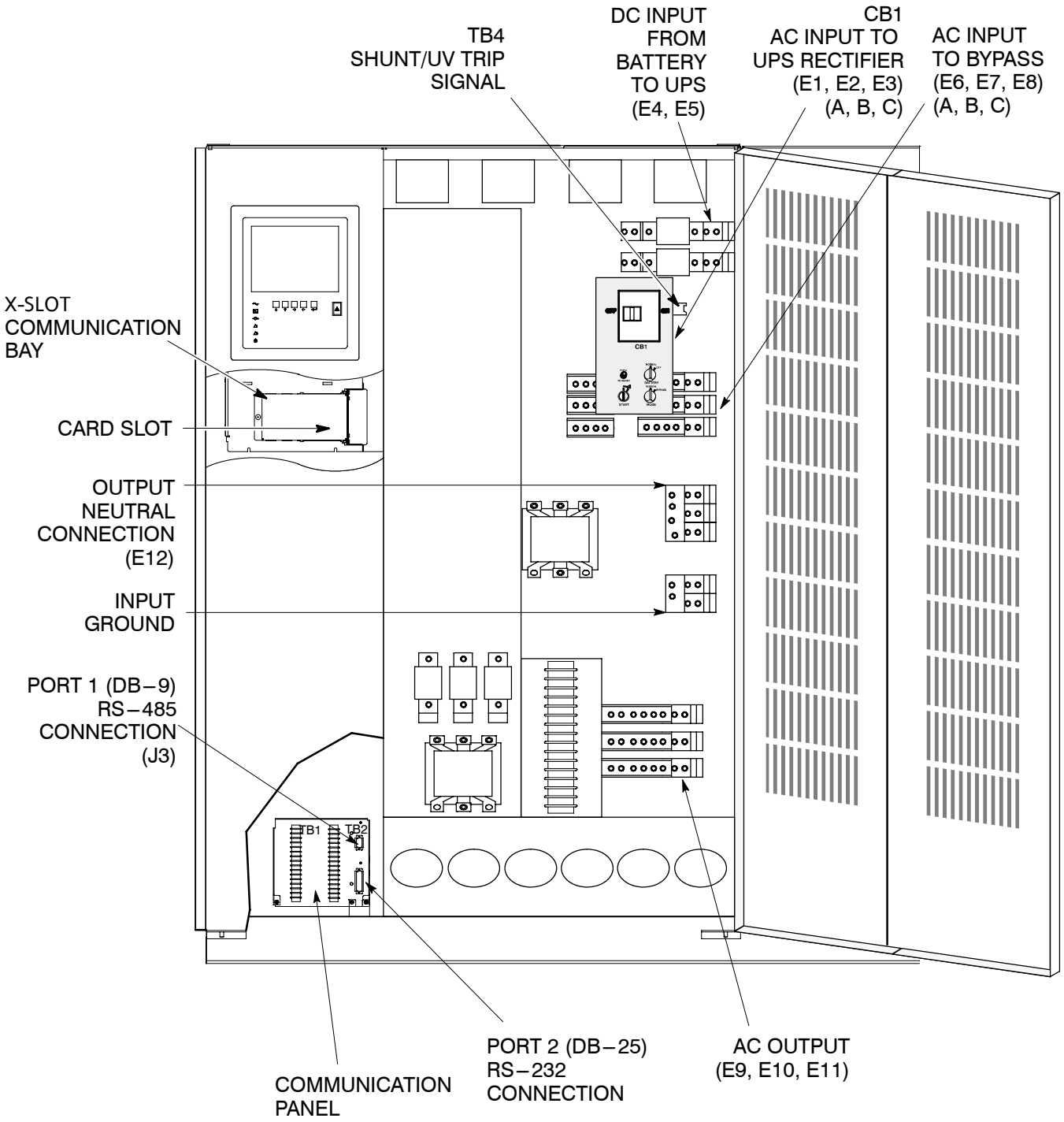



## UPS SYSTEM WITH OPTIONAL RECTIFIER AND BYPASS INPUT ISOLATION TRANSFORMER AND OUTPUT AUTO TRANSFORMER (208V INPUT DUAL FEED)

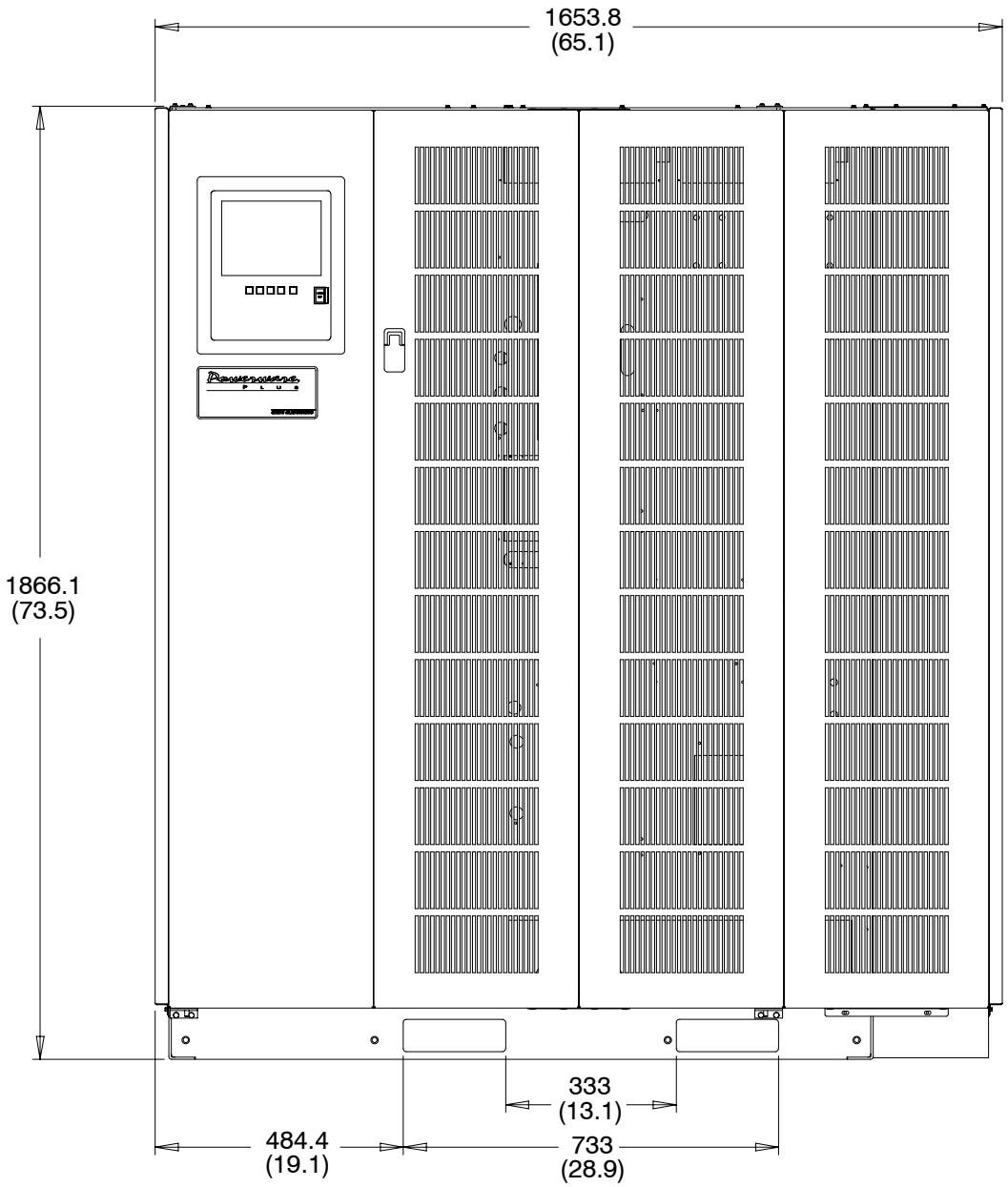
*NOTE 1: A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conductor.*

*NOTE 2: See Table U to determine when an input transformer is required.*

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **ONELINE DRAWINGS OF UPS SYSTEM** | | |
| *DRAWING NO:* | 164201037–4 | *SHEET:* | 4 of 4 |
| *REVISION:* | E | *DATE:* | 113004 |



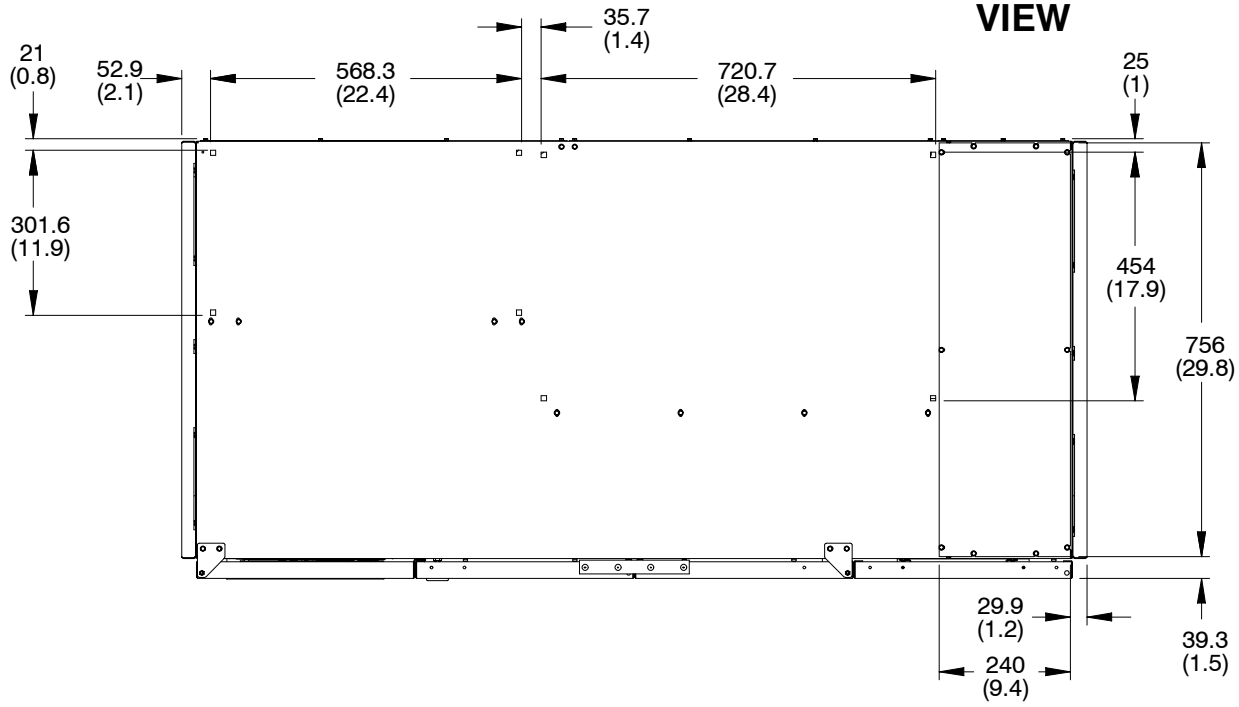

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **LOCATION OF UPS POWER TERMINALS** | | |
| *DRAWING NO:* | 164201037–5 | *SHEET:* | 1 of 1 |
| *REVISION:* | E | *DATE:* | 113004 |

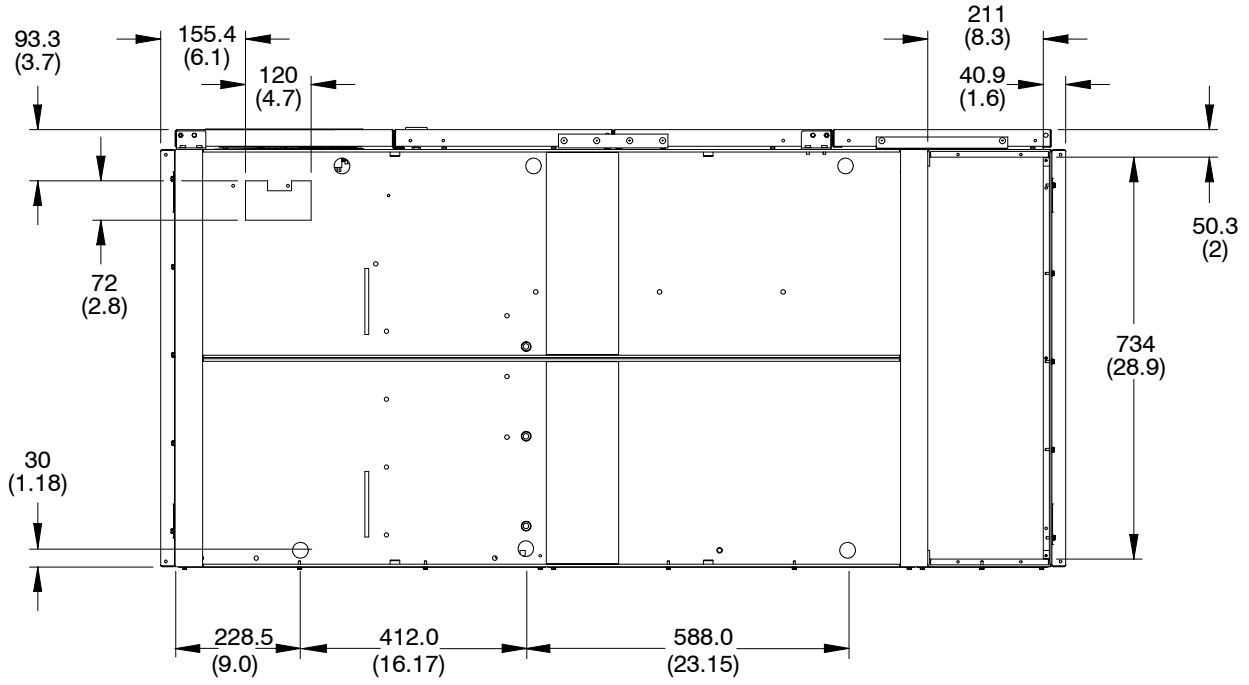



Dimensions are in millimeters (inches)

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **UPS CABINET** | | |
| *DRAWING NO:* | 164201037–6 | *SHEET:* | 1 of 2 |
| *REVISION:* A | | *DATE:* | 020497 |

## UPS CABINET TOP VIEW

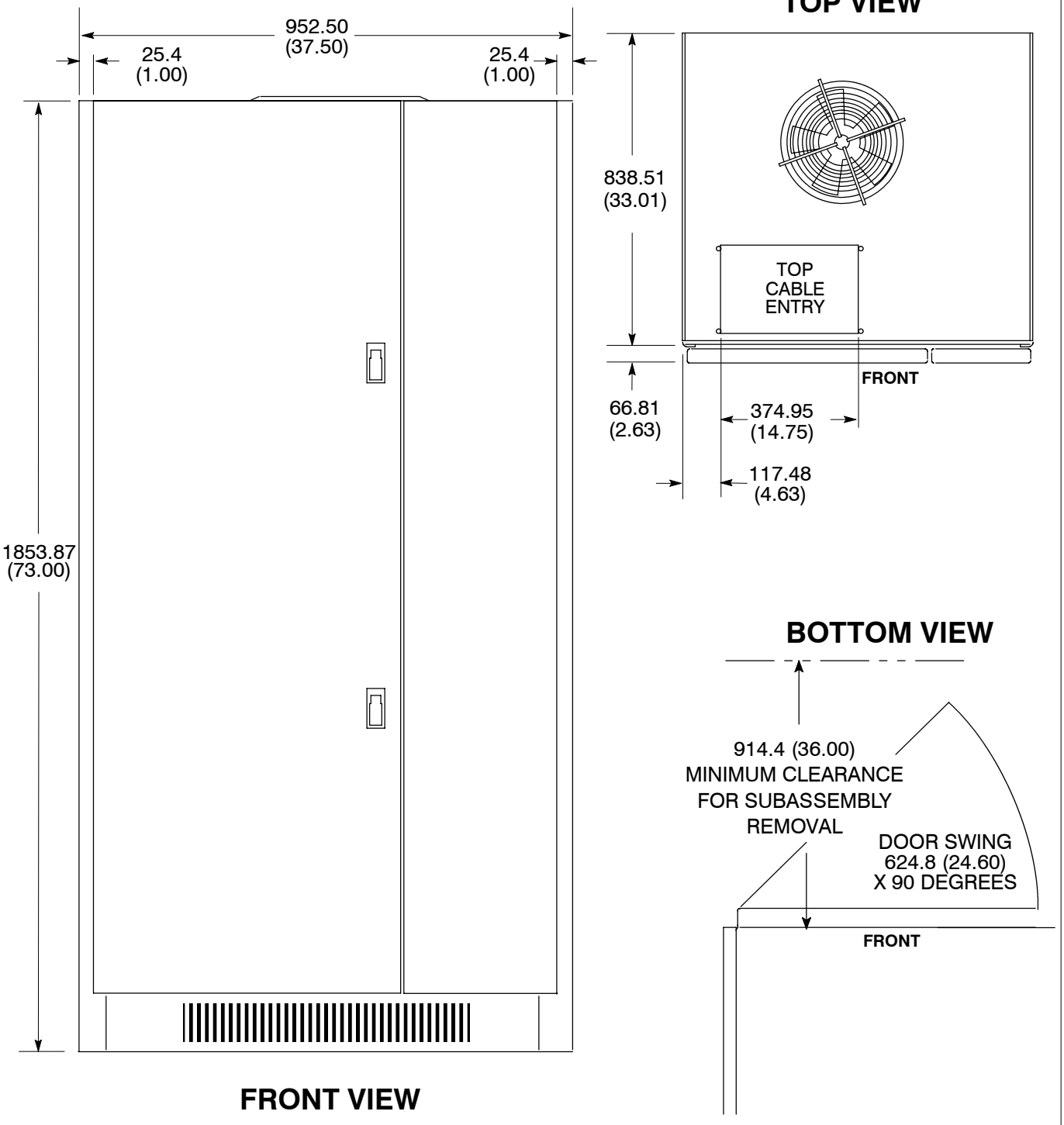



Dimensions are in millimeters (inches)

## UPS CABINET BOTTOM VIEW

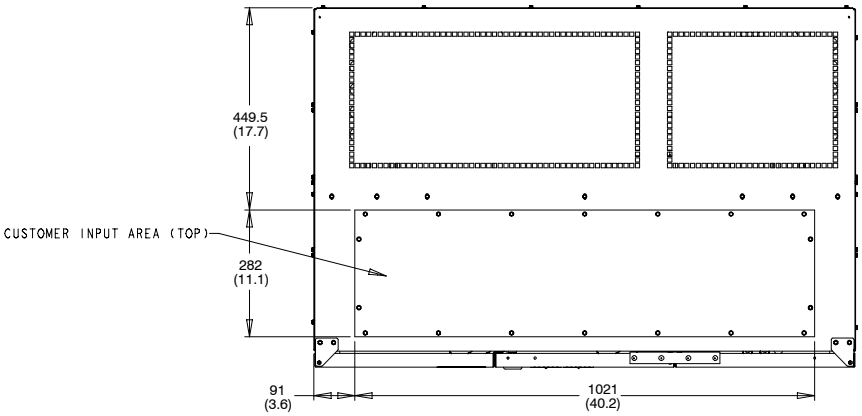
| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **UPS CABINET** | | |
| *DRAWING NO:* | 164201037–6 | *SHEET:* | 2 of 2 |
| *REVISION:* | A | *DATE:* | 020497 |



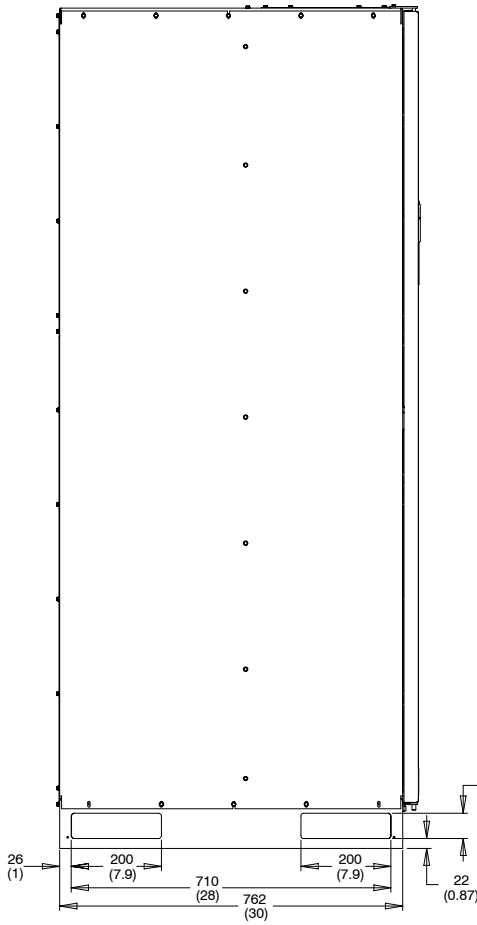

Dimensions are in millimeters (inches)

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **TRANSFORMER CABINETS** | | |
| *DRAWING NO:* | 164201037–7 | *SHEET:* | 1 of 3 |
| *REVISION:* E | | *DATE:* | 113004 |

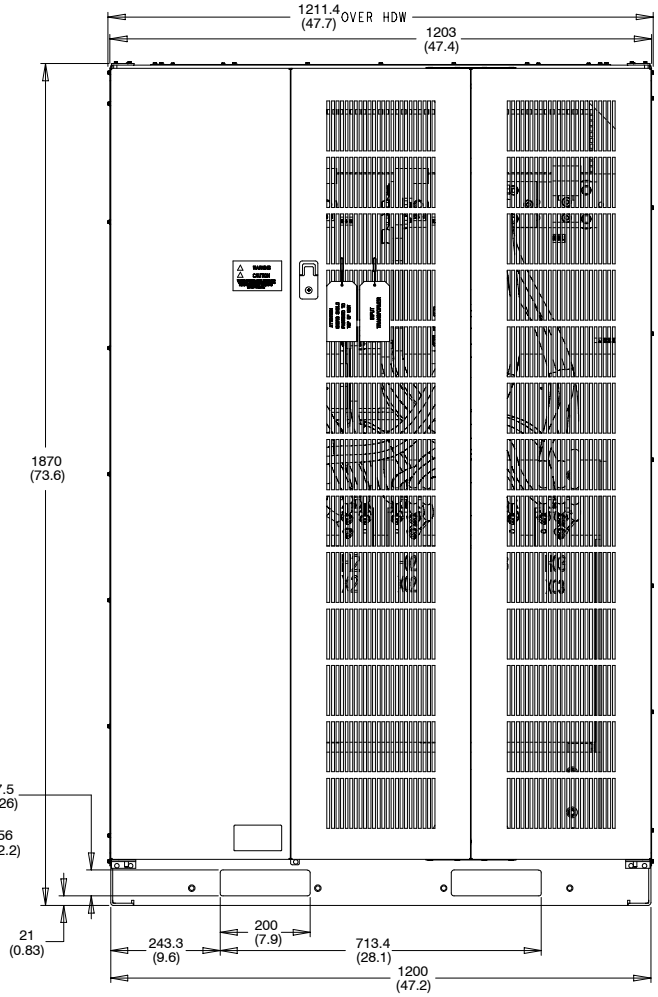
## TOP VIEW




## SIDE VIEW




## FRONT VIEW

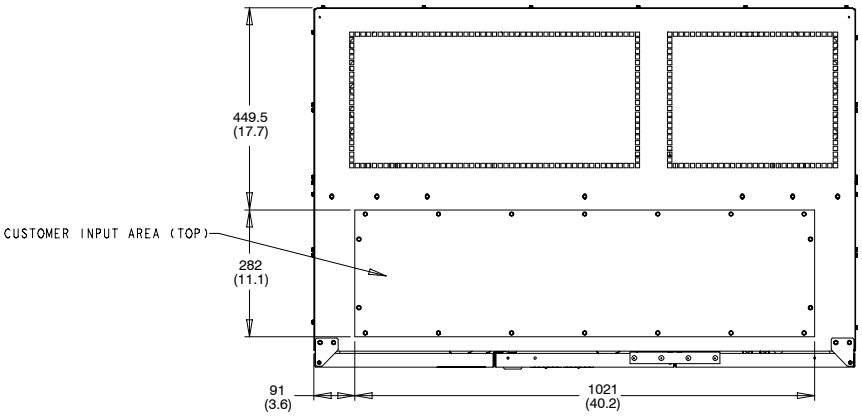



## INPUT ISOLATION TRANSFORMER CABINET (208/480)

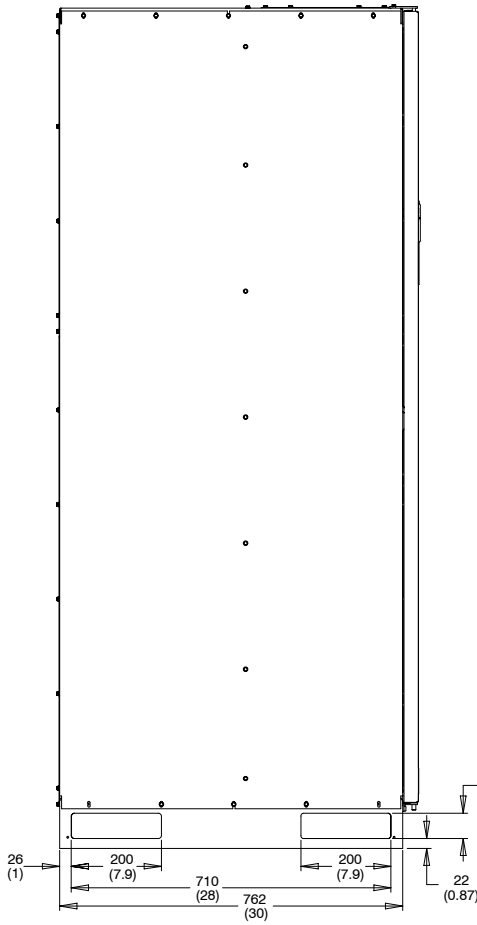
| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **TRANSFORMER CABINETS** | | |
| *DRAWING NO:* | 164201037–7 | *SHEET:* | 2 of 3 |
| *REVISION:* C | | *DATE:* | 121598 |

Dimensions are in millimeters (inches)

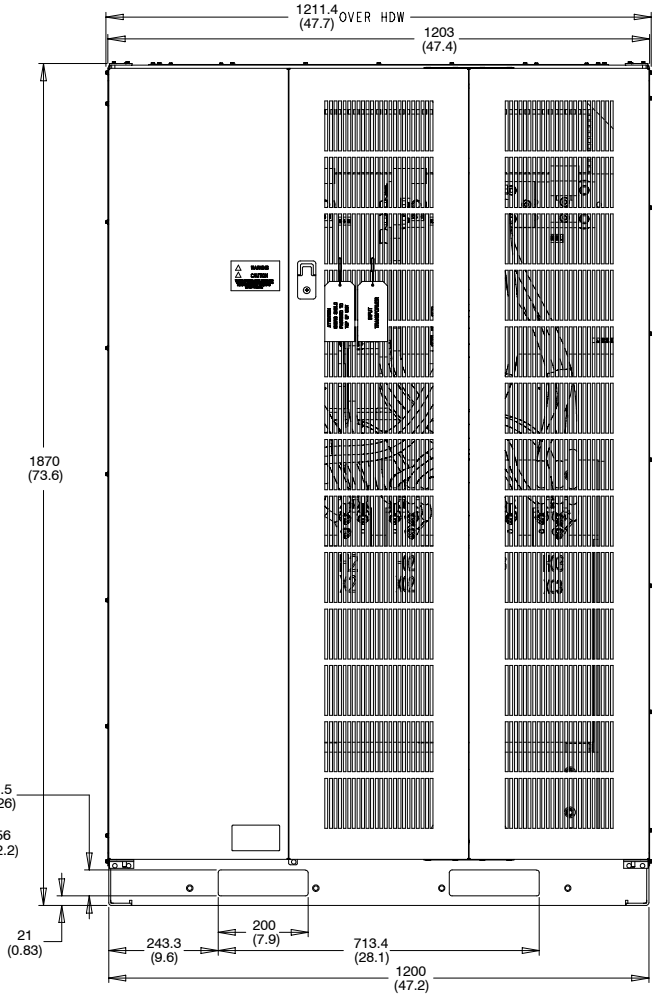
## TOP VIEW




## SIDE VIEW



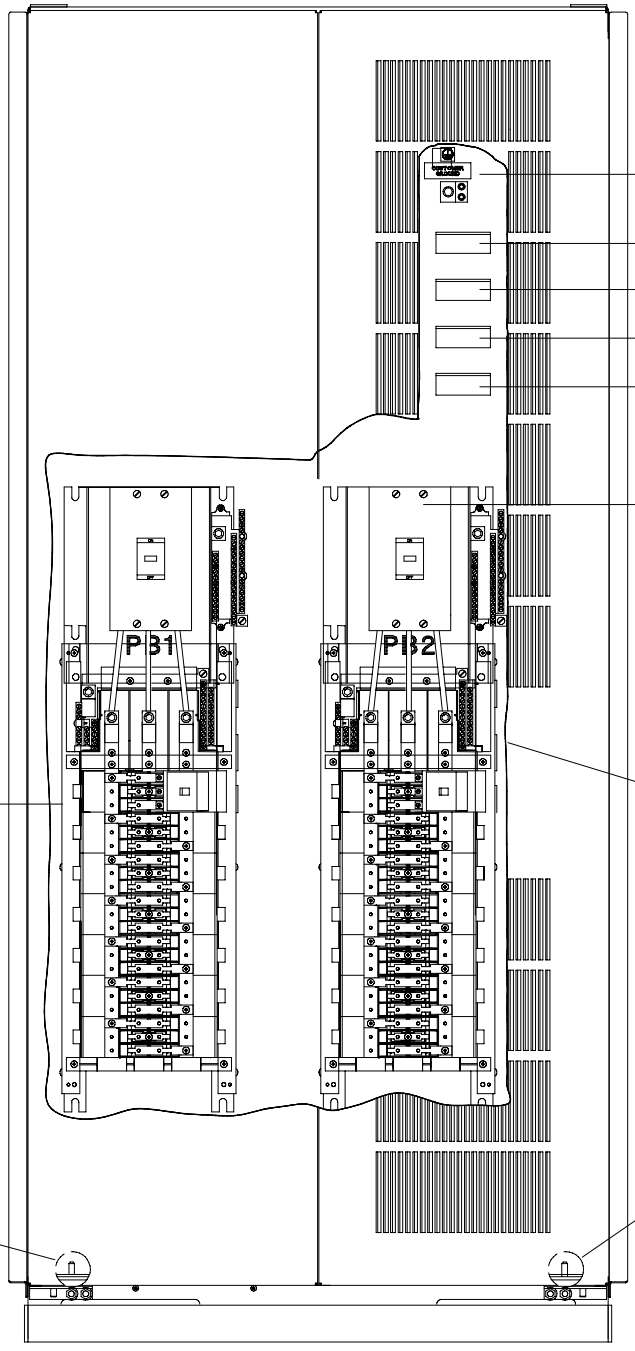

## FRONT VIEW




## OUTPUT AUTO TRANSFORMER CABINET (480/208)

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **TRANSFORMER CABINETS** | | |
| *DRAWING NO:* | 164201037–7 | *SHEET:* | 3 of 3 |
| *REVISION:* C | | *DATE:* | 121598 |

Dimensions are in millimeters (inches)




**Input Ground**
**(2) #6–350 KCM**

**∅A E1**

**∅B E2**

**∅C E3**

**Neutral E4**

**PB2**
**(Optional)**

**42-Pole Panelboard**
**With Main Breaker**
**225A 600V Square D Type**
**NQOM442M225IG–NL**

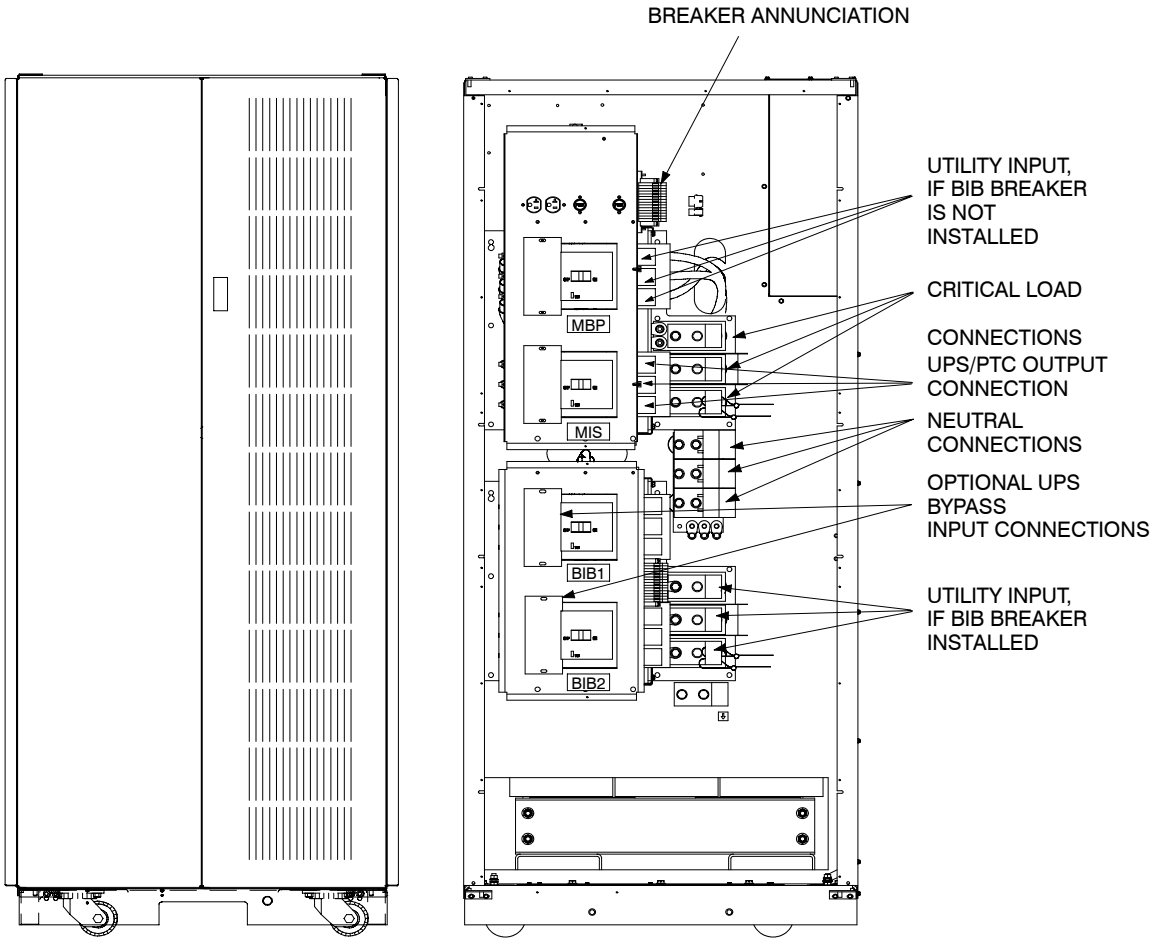
**Branches–QO Plug-On and QOB Bolt-On Circuit Breaker. 15–70A, 1-Pole; 15–100A 2- and 3-Pole; 125A, 2-Pole.**

**Grounding Stud**

**Grounding Stud**

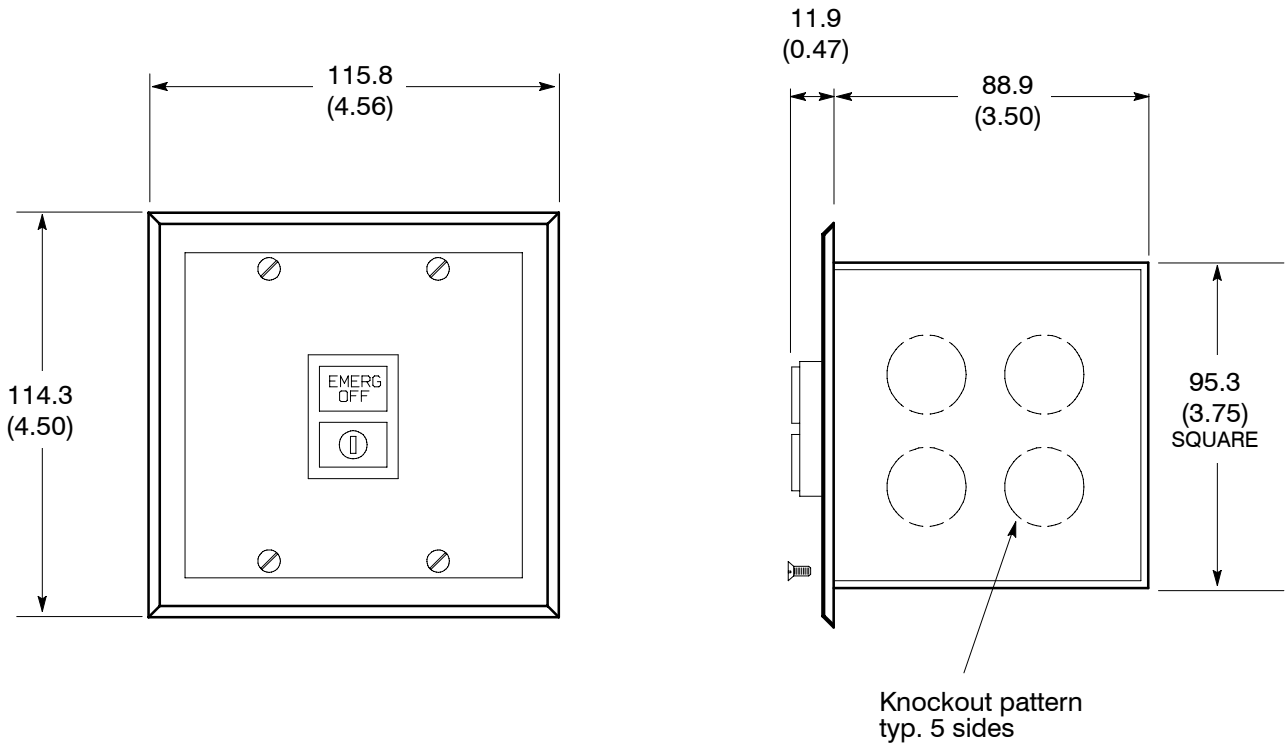
*NOTE 1: Refer to Powerware 9315 Power Distribution Module Installation and Operation Manual 164201061 for PDM installation and operation.*

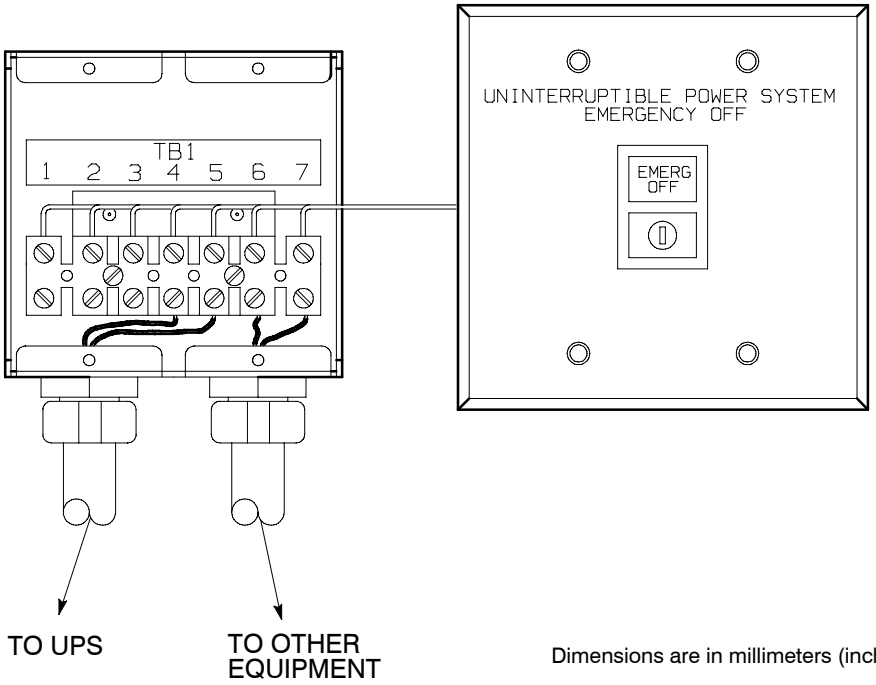
| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **POWER DISTRIBUTION MODULE** | | |
| *DRAWING NO:* | 164201037–8 | *SHEET:* | 1 of 1 |
| *REVISION:* D | | *DATE:* 041500 | |




*NOTE 1: Refer to Powerware 9315 Maintenance Bypass Module (MBM) Installation and Operation Manual 164201233 for MBM installation and operation.*

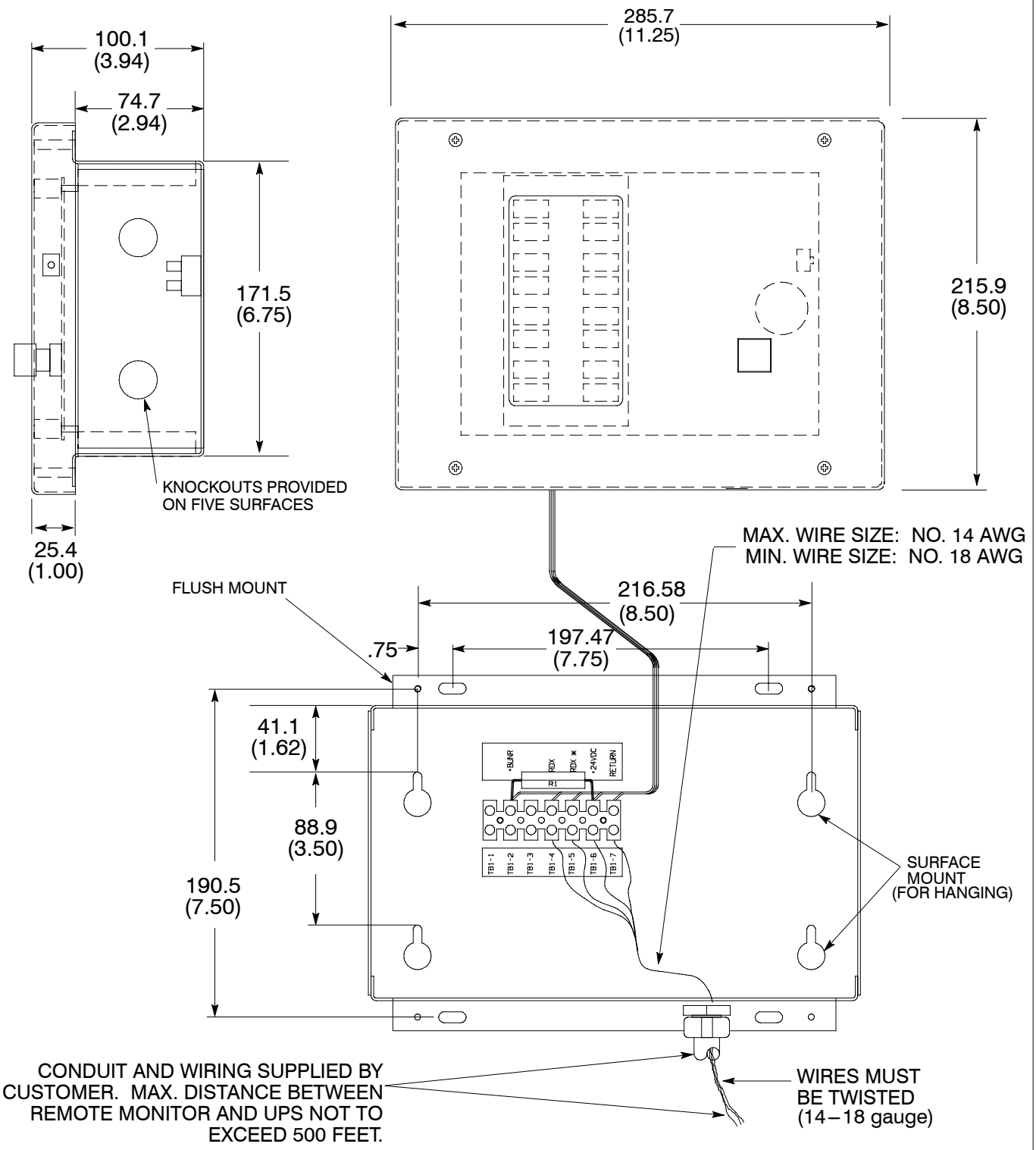
| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **MAINTENANCE BYPASS MODULE** | | |
| *DRAWING NO:* | 164201037–9 | *SHEET:* | 1 of 1 |
| *REVISION:* D | | *DATE:* 041500 | |



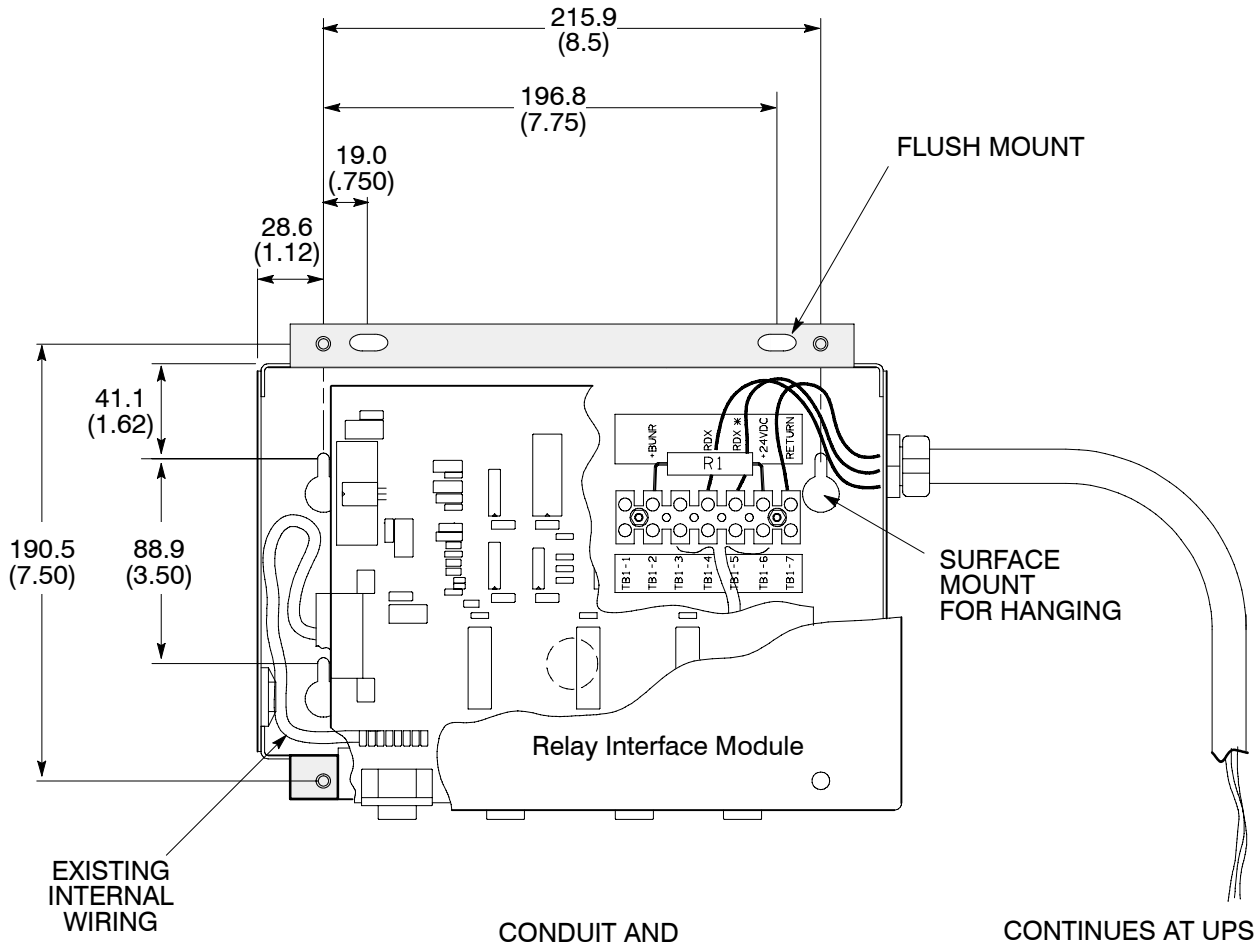

Dimensions are in millimeters (inches)

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **REMOTE EMERGENCY POWER OFF** | | |
| *DRAWING NO:* | 164201037–10 | *SHEET:* | 1 of 1 |
| *REVISION:* | D | *DATE:* | 041500 |




Dimensions are in millimeters (inches)

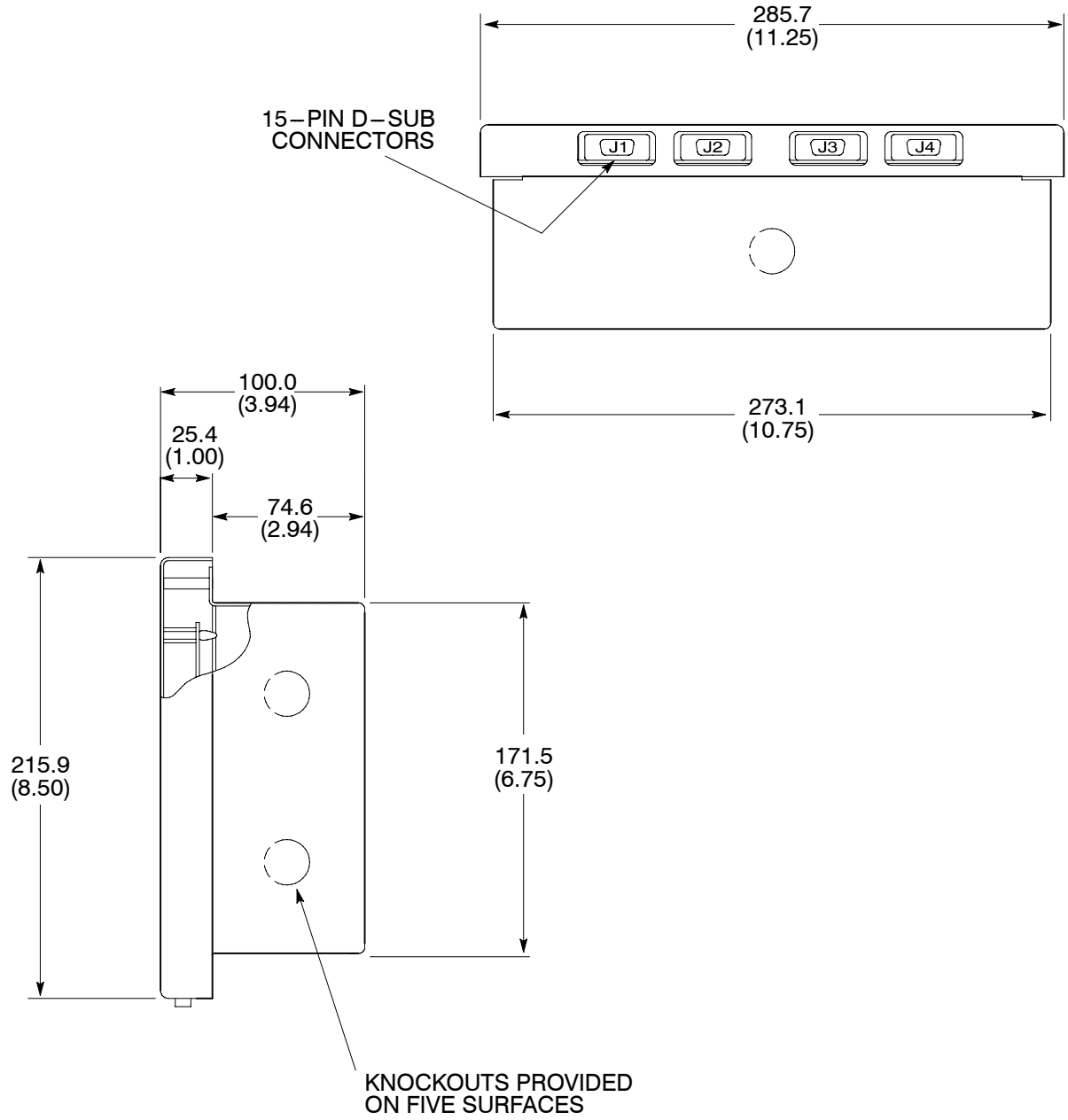
| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **REMOTE MONITOR PANEL** | | |
| *DRAWING NO:* | 164201037–11 | *SHEET:* | 1 of 1 |
| *REVISION:* | D | *DATE:* | 041500 |




CONDUIT AND
WIRING SUPPLIED
BY CUSTOMER.
Maximum distance between
RIM and UPS not to exceed
500 feet. Wires must be twisted.
MAX WIRE SIZE NO. 14 AWG.
MIN WIRE SIZE NO. 18 AWG.

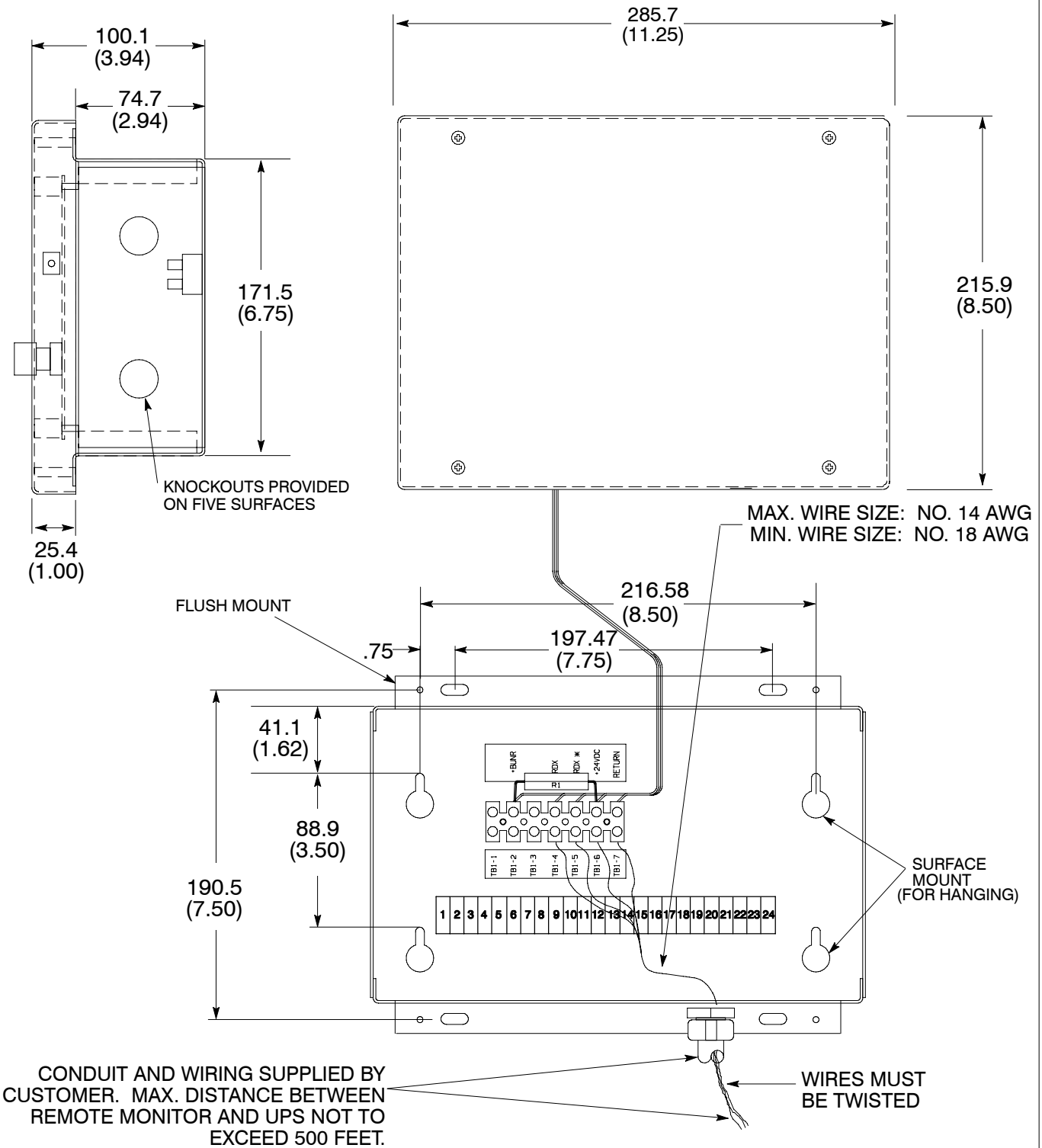
Dimensions are in millimeters (inches)

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **RELAY INTERFACE MODULE** | | |
| *DRAWING NO:* | 164201037–12 | *SHEET:* | 1 of 2 |
| *REVISION:* | D | *DATE:* | 041500 |



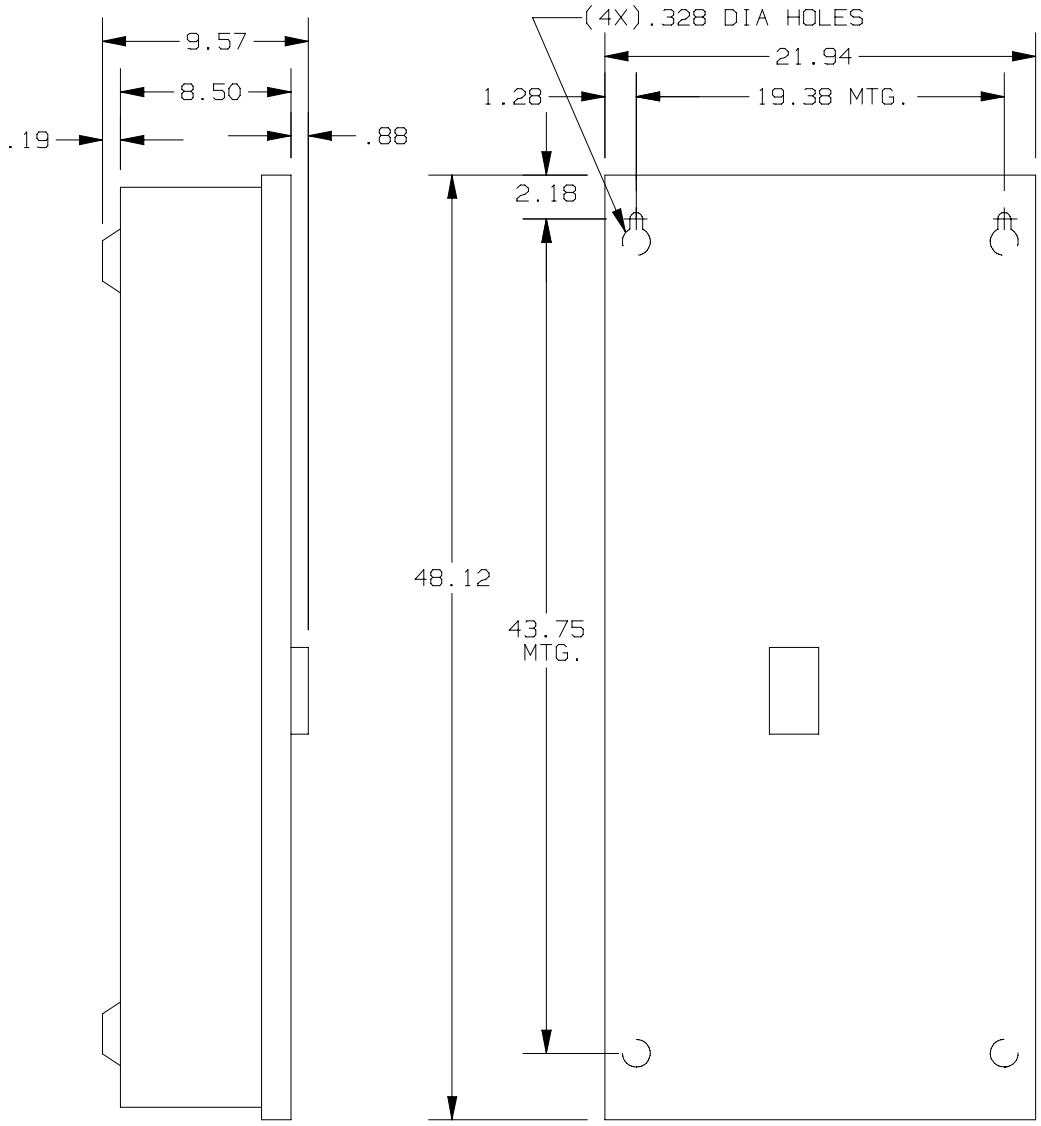

Dimensions are in millimeters (inches)

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **RELAY INTERFACE MODULE** | | |
| *DRAWING NO:* | 164201037–12 | *SHEET:* | 2 of 2 |
| *REVISION:* D | | *DATE:* | 041500 |




Dimensions are in millimeters (inches)

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **SUPERVISORY CONTACT MODULE** | | |
| *DRAWING NO:* | 164201037–13 | *SHEET:* | 1 of 1 |
| *REVISION:* | D | *DATE:* | 041500 |

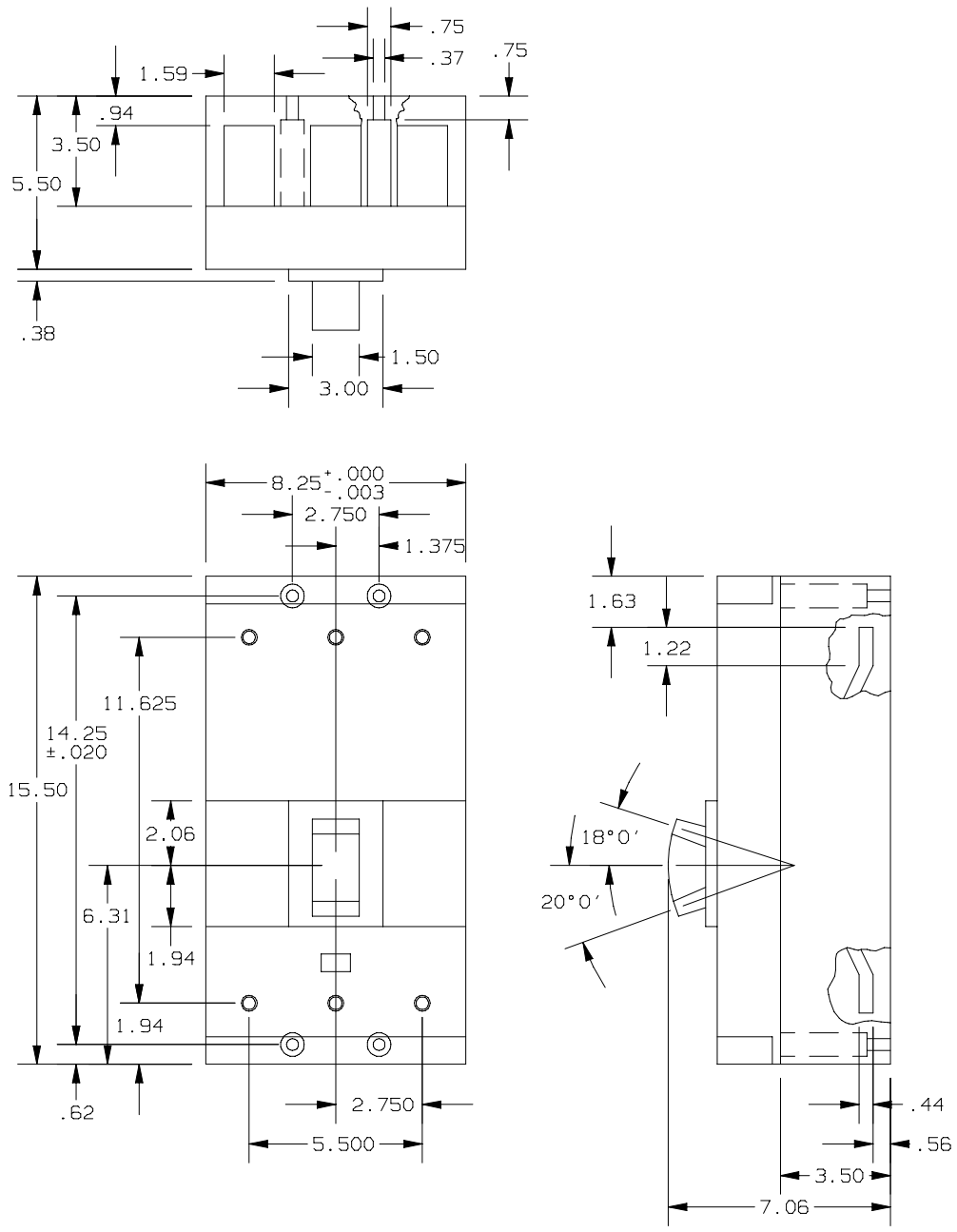



# ENCLOSURE FOR K1200 BREAKERS

ENCLOSURE HAS NO KNOCKOUTS.
KNOCKOUTS TO BE DETERMINED AT
TIME OF INSTALLATION.

WEIGHT
75 LBS (34 KG)

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **BATTERY DISCONNECT SWITCH** | | |
| *DRAWING NO:* | 164201037–14 | *SHEET:* | 1 of 2 |
| *REVISION:* A | | *DATE:* | 010198 |




# TYPE K1200 BREAKER OUTLINE

| | | | |
|---|---|---|---|
| *DESCRIPTION:* | **BATTERY DISCONNECT SWITCH** | | |
| *DRAWING NO:* | 164201037–14 | *SHEET:* | 2 of 2 |
| *REVISION:* A | | *DATE:* | 010198 |

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164201037 F